# commodore

# INTERFACE

# Table of Contents

The charter of the Commodore Interface (formerly the Commodore Newsletter) is to provide a method of sharing up-to-date information and programs relating to the PET, CBM, and VIC computers. Membership charge for one year's subscription in the United States is $15.00. Subscriptions in Canada and Mexico are $25.00 per year.

We would like to publish features from PET/CBM/VIC users concerning specific applications, interesting discoveries or helpful hints worthy of being shared. If you would like to contribute to future issues of the Commodore Interface, please send your program, article, letter, or comment to:

    The Editor
    Commodore Interface
    681 Moore Road
    King of Prussia, PA 19406

If we publish your program or article we will send you a copy of "The PET/CBM PERSONAL COMPUTER GUIDE" or, if you choose, a full year's subscription to the Commodore Interface.

# Commodore Expands, Reorganizes

**Commodore Prepares U.S. Market Assault** — Commodore is coming! We're moving forward rapidly as we prepare for a major push in the United States. We've already started the New Year with several impressive accomplishments, just a few of which are listed here:

**Commodore Interface** — Our newsletter has a new look, a new name, and in the months to come we'll have a new emphasis on articles which appeal to both new and experienced computerists, including a wide variety of how-to and information articles. Our new format reflects Commodore's renewed emphasis on the U.S. marketplace, and our commitment to spreading the word that ours are the best microcomputers you can buy. . .for business, education, engineering and recreation.

**Commodore Computer Fairs** — our first computer fair in Philadelphia drew over 16,000 people, at the height of the Christmas season and with a crucial Philadelphia Eagles home game on one of the two days of the fair. Our second fair, in Boston, drew over 15,000 people! This attendance is larger than many national computer conventions. . . clearly, there's a strong and growing interest in microcomputers. . .and Commodore has a computer for just about everyone, from a complete business computing system under $4500 to a low-cost color computer (the VIC 20) priced under $300.

**Expanded Software Department** — Commodore has added several new members to our software support staff, but we still need good 6502 programmers, not only for our business and educational systems but also to write software for our new VIC 20 personal computer.

**Commodore Software Department** — the new directory was compiled by our software team and lists more than 500 computer programs on tape or disk available from more

than 25 sources. Commodore's own software continues to grow. Don't miss the software reviews in this issue of the newsletter.

**Income Tax Package** — one of the brightest stars in our new software directory is our Computerized Federal Income Tax Package, which was introduced in time for this year's tax season. The package lets you do your taxes on your Commodore microcomputer, and print out the results on special computerized federal income tax forms. This package is great for professional income tax preparers and comes in an abbreviated version for home tax preparation.

**Commodore Publications Group** — several writers have been added to Commodore's Valley Forge organization to help provide "user friendly" documentation for our growing number of business software programs, and to revise selected hardware instruction manuals to bring them up to date.

**VIC 20 Supplement** — this issue of the Commodore newsletter includes a special supplement devoted exclusively to the new VIC 20 personal computer system. The new computer, scheduled to go on sale in the U.S. in late March 1981, has shattered the price-performance barrier for personal computers by offering color, sound, graphics, programmable function keys, a full size keyboard and a 5K memory expandable to 32K for $299.95. The new product is already back-ordered and will be sold through selected retail stores as well as computer dealers. Many retailers have told us they believe the VIC will be the first real "home" computer and we're beginning to agree. The VIC was originally seen as a "bridge" between the hobbyist and home computer markets but the tremendous interest by store owners and customers alike has redefined the VIC as a true "home" computer.

**What is a Personal Computer?** — Robert Lydon, publisher of PERSONAL COMPUTING MAGAZINE, who visited us recently, likes to define the "personal computer" as "a computer which can be used by a non-computer scientist". He feels that all computers are used by non-computerists are personal computers whether they're used in the home, at work or in school. He's right. Commodore likes to define the VIC as a "personal computer", the CBM as a "business computer", and the PET as a "professional" computer. . .differentiating our product line by primary application. . . but we agree with Mr. Lydon that these microcomputers may be grouped under his umbrella definition of "personal computer", and we also agree that one of the goals of personal computing is to make computing friendly enough so any non-computerist can use it to his or her benefit.

**New VIC Magazine** — Robert Lock, another editorial friend of Commodore's, has announced a new magazine called HOME AND EDUCATIONAL COMPUTING!, The Resource Magazine For the VIC Computer. This publication will focus primarily on the VIC 20 computer but will use the VIC to show how computing can be used by almost anyone, in a wide variety of different environments. Contributing editors will include some of the most prominent and knowledgeable computerists in the industry, including Jim Butterfield, Tory Esbensen, Harvey Herman, David Thornburg, and the "user friendly" writers from Avalanche in California (Avalanche produced the VIC user manual). The new magazine is already accepting subscriptions for the first 3 quarterly issues of 1981. . .introductory price is $5.00. . .or you can get the first issue only for $2.00. Write to:

HOME AND EDUCATIONAL
COMPUTING!
P.O. Box 5406,
Greensboro, N.C. 27403

# Fire at the MGM Grand!

*by Sheila deSimone*
*& Joseph Devlin*

**The fire at the MGM Grand Hotel in Las Vegas was one of the most tragic fire disasters in U.S. history.**

It was the third and final day of COMDEX 80. A minor fire near the kitchen of the MGM hotel, kindled by the hotel's flammable synthetic decorative trim, became a major inferno within minutes. By the time the fire was over there were hundreds of injuries and a death toll of 84 persons, making it the second deadliest hotel fire in U.S. history. Air Force, police and civilian helicopters were used to rescue hundreds of helpless victims trapped in the upper floors of the blazing hotel. As people were rescued they were brought to the East Hall of the Las Vegas Convention Center. Keeping track of the evacuees and the casualties soon became more than emergency personnel there could handle. The rescue workers were soon burdened with the additional task of handling phone calls from worried relatives eager for information about loved ones who had been staying at the MGM.

When Marge Jillett arrived on the scene offering her aid, it was gratefully accepted. Marge is Commodore's Public Relations Director. She and her crew had been staying across the street from the MGM at the Flamingo Hilton. They were in town to man the Commodore COMDEX booth at the Las Vegas Convention Center. Marge initiated and organized a "Commodore Command Center" in the East Hall of the Convention Center where vital information for the evacuees, their relatives and friends could be gathered and processed.

With the consent and encouregement of Commodore president, Jack Tramiel, the Commodore staff worked through the night. Seven complete Commodore computer systems were taken from the COMDEX booth and used at the Command Center. They were manned from Friday morning until

early Sunday morning, leaving only one person and a hand-scrawled sign to represent Commodore for the last day of COMDEX.

Jillett recruited volunteers to enter information about the conditions and whereabouts of victims and to answer the countless phone calls from concerned friends and relatives. Everyone pitched in. Al Ciaglia, Tom Priestley and Jerry Ziegler, all Commodore Regional Managers, along with Bob Cascarino, General Manager Computer Systems, Nancy Ricks, Sales Administrator and Bill Lewis and Ed Havlick, District Sales Managers all worked with Jillett until three a.m. Sunday.

Brian Padol, representing Micro-Search, Inc. at COMDEX and president of Computer Freaks, Inc. supplied Commodore with a disaster aid program he wrote and adapted on the spot which listed evacuees and allowed for immediate search of registered victims. "I was impressed with the way Commodore offered their help in the situation, and I was glad to assist in any way I could," Padol said.

Volunteers typed in the name, address, MGM room number and

the site of relocation of thousands of evacuees. This information about the victims was stored in the computer and categorized by a numerical code that Padol created. The information was easily located either by record number or by searching for a specific item, such as a last name, city or MGM room number. The lists were gathered, printed out, copied and distributed continuously throughout the day as the records changed and grew.

Lieutenant Ross of the Metropolitan Police Department inLas Vegas stated simply, "We are not equipped to handle a disaster of this magnitude without the computers and the personnel. . ." The Command Center became a vital information center not only for the police department but the fire department, Red Cross and other service organizations as well.

Since the fire Padol has revised and improved upon his disaster aid program. He has given this program to Commodore free of charge. Commodore will make the disaster aid program available to those who might need it, through Commodore dealers. Dealers may obtain the program from Commodore's 7 regional distribution centers.

# JAMES FINKE:
# Commodore's New President

On January 7, Irving Gould, Chairman of the Board of Commodore International Limited, announced the appointment of James Finke as President and Chief Operating Officer. At the same time, Mr. Gould announced that Jack Tramiel, formerly President, has been appointed Vice Chairman of the Board and Chief Executive Officer.

Commenting on the appointment, Mr. Tramiel said, "We are very fortunate to have a man of the caliber of Jim Finke join Commodore. There are few men in our industry today who can claim as diverse and extensive a background as Jim."

## International Experience

Mr. Finke's prior professional experience has been concentrated in high technology and semiconductor-oriented capacities. He was most recently employed by Data General Corporation, a leading manufacturer of computers and peripheral equipment. As Vice President and General Manager-Europe, Mr. Finke had overall management responsibility for the company's European operations.

Prior to his association with Data General, Mr. Finke was General Manager of the General Electric Medical Divisions International Operations from 1974 through June of 1978, where he reshaped a money-losing business into a profitable operating entity.

## Semiconductor Management

From 1964 to 1974, Mr. Finke was with Motorola, a world-wide leader in the manufacture of portable communication equipment and semiconductors. Starting out as the Director of International Operations for the company's semiconductor division, Mr. Finke rose through the organization to his eventual position as Vice President

and General Manager of Motorola's communication division European Operations.

With Commodore growing by leaps and bounds Mr. Finke will have his hands full. We all wish him luck in his new job.

# CBM COMPUTER FAIRS ATTRACT THOUSANDS

*by Sheila deSimone*

The first Commodore Computer Fair was a tremendous success. More than 16,000 people attended the fair held in the Bellevue Stratford Hotel in Philadelphia on December 13 and 14. The fair was held in part to commemorate the recent move of Commodore's U.S. headquarters to the Philadelphia area and partly as a "pilot" for a nationwide series of "Commodore Computer Fairs" to be held in more than two dozen cities during 1981.

The Computer Fair offered, free to the public, a variety of exhibits and seminars presented by distinguished businessmen and educators in the microcomputer field. Over 20 exhibitors demonstrated microcomputer applications in education, small business, accounting, portfolio management, tax preparation, engineering, wordprocessing, recreation and the use of microcomputers by disabled people.

The speakers and topics from the education seminars included:

Tom Gilmore, Gwynedd Mercy College
"Microcomputers at the University"

Al Rosen, MicroPhys
"Easy-to-Use Teaching Programs"
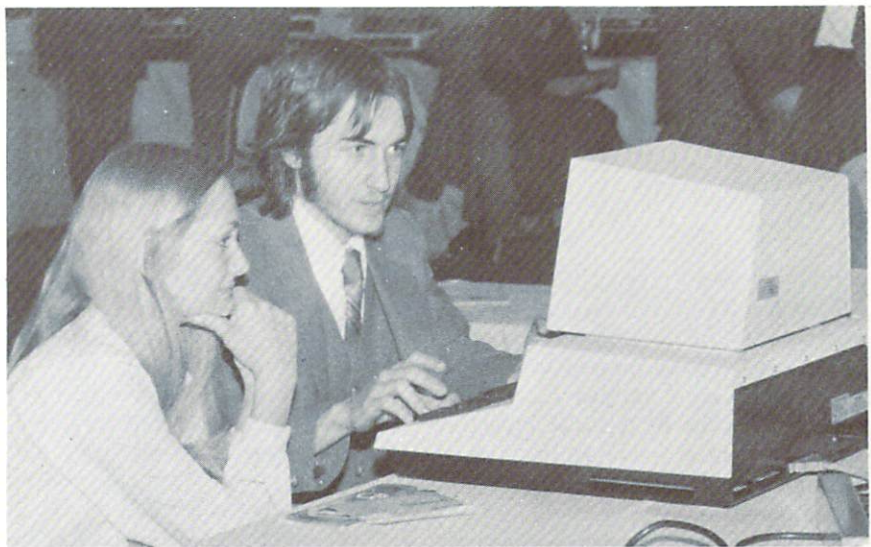
Dr. Ludwig Braun, Stonybrook University
"Getting Started as a Teacher with Computers in the Classroom"

Joseph Gekoski, The Mader Group
"Hands-on Demonstration of a Business Decision-Making Program"

Business seminar speakers and topics included:

Frank McCullough, Commodore
"Choosing an Under — $5,000 Business Computer System"

Ron Williams, CMS Software
"Microcomputer Program for Small Business Management"

John Kelsey, Dow Jones
"Using a Microcomputer to Manage Your Investment Portfolio — the Dow Jones System"

Bert Allen, Micro-Search, Inc.
"1040 Income Tax Preparation on a Microcomputer"

Edward Shaw, CPA, Deloitte, Haskin and Sells
"Microcomputing and Auditing; An Alternative to Time Sharing"

Bob Crowell, MicroAmerica
Single and Multi-Station
"Wordprocessing for Secretaries and Bosses"

Michael Schaff, Schaff, Soils and Systems
"Microcomputers for Municipalities — Water Pump Station Management & Surveying Applications"

New products previewed at the fair included the new VIC 20 "Video Interface Computer", the first color computer for under $300, and Commodore's electronic programmable thermostat, which can cut fuel expenditure up to 30%.

Computers, calculators and watches were given away. Larry Bowa, shortstop for the World Champion Philadelphia Phillies was there to meet fairgoers, sign autographs and announce prize winners. Leighton Wildrick, Director of International Commerce for the Commonwealth of Pennsylvania, attended the fair on behalf of Pennsylvania Governor Richard Thornburg.

The second Commodore Computer Fair was held in Boston on February 7 and February 8 and was another big success. Over 15,000 people attended. Additional Fairs will be held in a major city in each of the company's seven U.S. sales regions during the next four months. Be on the watch for information about your local fair.
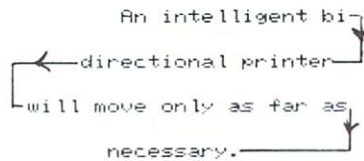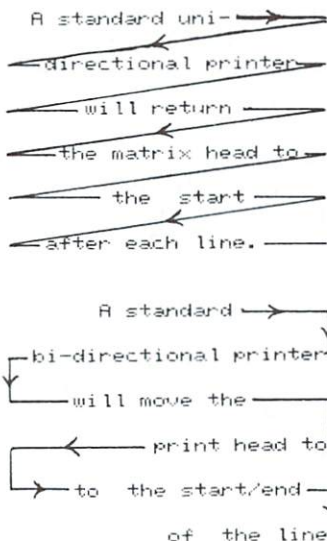
# New High Speed Printer For CBM Computers

*by Joseph Devlin*

Have you been longing for a high speed printer to complement your Commodore PET or CBM computer? If so, you will be pleased to learn that Commodore has just given it's approval to the 8024 serial impact matrix printer manufactured by Mannesman Tally. Any authorized Commodore dealer who wishes to handle this product can now obtain these printers direct from Mannesman Tally for distribution through his store. While this printer lacks the graphics capabilities of the Commodore 2022 tractor printer, its high speed and 7 x 7 half space dot matrix pattern make it an excellent business printer when large quantities of high resolution copies are required.

The 8024 is a logic seeking intelligent bi-directional printer. A bi-directional printer is one that prints the first line left to right, the next line right to left, etc. An intelligent printer automatically moves to the end or start of the printed line rather than moving to the edge of the print region. This ability saves the printer the time a standard printer normally takes to traverse empty spaces at the beginning or ending of the line.

```
example of out put fom 8024:

 A standard uni-
   directional printer
      will return
      the matrix head to
       the   start
     after each line.


      A standard
  -bi-directional printer
    will move the
        print head to
   -to  the start/end
       of  the line
```

```
     An intelligent bi-
  directional printer
  will move only as far as
     necessary.
```

The 8024 will print up to 160 characters per second. Like the Commodore 4022 printers, the 8024 is a dot matrix printer (each character is composed of a pattern of dots). The 8024 can be purchased utilizing either the standard 7 x 7 dot matrix or with a 7 x 9 matrix for superior print definition.

The paper is fed by dual tractors above and below the print line which assure positive alignment and rapid paper advancement. The tractors are adjustable, fitting paper widths from 4 to 15" wide and 3 to 17" long. The 8024 has switches for line feed and form feed. The paper can also be positioned by hand. A ribbon cartridge with an average life of two million characters makes ribbon changes both infrequent and also trouble free. Simply remove one ribbon and snap another into place.

There is an internal 132 character buffer which is filled before the line is printed. Characters can also be printed at double width for titles etc. The 8024 has an internal bell which rings when the matrix head exceeds the edge of the page and also when the printer is about to run out of paper. Up to 5 copies can be made simultaneously. There is a five position lever which allows the user to control the impact force of the matrix head.

The 8024 is plug-compatible with PET and CBM computers and is connected to the computer through the standard Commodore IEEE cable.

The suggested retail price for model 8024-7 (7x7 matrix) printer is $1995.00 and $2145.00 for model 8024-9 (7x9 matrix).

For further information please contact:

Mannesman Tally
8301 South 180th Street
Kent, Washington 98031
(206) 251-5524

*The New VIC 20 Personal Computer*

## COMMODORE LEARNING SERIES MAKES COMPUTING EASY

The Commodore Learning Series—individual book-and-cartridge sets—lets you start using the VIC computer immediately without any peripherals. All you do is plug the cartridge into the back of the computer and read, using the accompanying book.

The first volume in the series is called *"Introduction to Computing . . . On the VIC"* and features everything from the "VIC Menagerie" to introductory programming. It's a fun introduction, designed to familiarize you with the VIC 20 and computing in general.

The second volume in the Commodore Learning Series is entitled, "Introduction to BASIC Programming . . . On the VIC." This volume starts your formal introduction to computer programming. Future volumes will deal with music, graphics and more.

The philosophy behind the book and cartridge series is this: first-time computerists are often reluctant to get into thick books about computer programming, no matter how well-written or entertaining they might be. Many of the lessons look ominous when first seen . . . and often, it is impossible to visualize what a particular instruction or command is supposed to do . . . especially if you're having trouble "getting it right."

To take some of the pain and agony out of the computer learning process, Commodore decided to develop a "three dimensional" learning guide which demonstrates on the television screen how a program or command is supposed to work, while at the same time providing a book with easy-to-read step-by-step lessons.

This "show and tell" approach represents an important innovation by Commodore and we hope that VIC users will find it as helpful as it's intended to be.

## Commodore breaks price barrier—Introduces VIC-20!

**Commodore International Ltd. (AMEX-CBU) has officially introduced the world's first full-featured color computer priced under $300.**

The new VIC 20, which retails for $299.95, was unveiled January 8 at the Consumer Electronics Show in Las Vegas.

The new computer puts Commodore squarely in the low-priced personal computer market with a fully expandable microcomputer which connects to any television set and rivals the features of existing microcomputers selling at 4 or 5 times the price.

The features speak for themselves:

- color
- sound
- programmable function keys
- 5K memory expandable to 32K
- standard PETBASIC
- full-size typewriter keyboard
- graphics character set
- plug-in program/memory cartridges
- low-priced peripherals
- joystick/paddles/lightpen
- self-teaching materials

"The new VIC (Video Interface Computer) is designed to be the most user friendly computer on the market . . . friendly in price, friendly in size, friendly to use and expand and enjoy," said Commodore Chairmen Irving Gould. "In 1977, we pioneered the personal computer industry with the world's first self-contained personal computer . . . the PET. Then we expanded the PET into a business system . . . the CBM. Now, we're introducing an entirely new generation of personal computers which anyone can afford to buy, to learn on and apply . . . from first-time users to hobbyists."

"With the VIC we—Commodore—are providing a computer system which helps almost anyone get involved in computing quickly and easily . . . with enough built-in expansion features to let the system "grow" with the user as his knowledge and requirements become more sophisticated.

**Expansion Features & Peripherals**

VIC system peripherials will include a low-priced tape cassette unit, single floppy disk drive, printer—and a broad range of add-on accessories which tailor the system to a variety of special applications from games to bookkeeping to telecommunications.

The VIC's memory—its capacity for storing and processing information—can be expanded using simple plug-in RAM cartridges.

# How the VIC was born

IN 1977, Commodore introduced the first self-contained personal computer (the PET). In late 1980, Commodore introduced the first color computer priced under $300. Both developments were made possible by the company's unique position as a vertically integrated multinational organization.

Vertical integration means that Commodore makes its own computers "from the ground up." That includes everything from design through engineering and production. Most significantly, Commodore designs and manufactures its own semiconductor chips . . . the computer's "brain."

It is no accident that both the PET and VIC were made possible by the development of proprietary semiconductor devices. In 1977, the PET was created around the 6502 microprocessor chip developed by Commodore's MOS Technology subsidiary in Valley Forge, Pa. Since then, MOS Technology's "computer on a chip" has become a standard in the microcomputer industry and is in fact used in several other microcomputers.

In 1980, MOS chip designers completed the Video Interface Chip (VIC), which provides the necessary interface between the computer and television set. The Video Interface Chip in turn gave rise to the "Video Interface Computer," although the "story of the VIC" is actually much more complex.

The real story dates back nearly 20 years, to when Commodore was marketing electromechanical calculators. Jack Tramiel, the founder and chief executive officer of Commodore, was among the first to recognize the need for a low-priced electronic hand-held calculator. The first low-priced Commodore calculators were consequently introduced several weeks before Texas Instruments entered the market and broke what had been a very high price barrier. Commodore went to Europe with its calculators and

> *"The Japanese are coming, so we will become the Japanese."*
> — **Jack Tramiel**

became the best-selling hand-held calculators on that continent.

Out of these early marketing experiences—and Commodore was and still is primarily a marketing company—Jack Tramiel resolved to vertically integrate Commodore so the company could exert stronger controls over its internal product development and pricing, and therefore meet a larger goal—to bring superior low-priced consumer electronics products to the world marketplace.

Commodore started moving toward the VIC more than a year ago. In the spring of 1980, Tramiel formally announced his intention to develop and market a computer priced under $300. More than a few thought the

new product was premature, or unnecessary . . . but Tramiel insisted, noting that several Japanese computer companies were already poised to enter the U.S. market with low-priced computers.

He said: "The Japanese are coming, so we will become the Japanese."

He was right. The Japanese were poised to assault the U.S. marketplace just as they attacked—and captured—the automobile and television markets.

To show the Japanese what they'd be coming up against, and to test market the new VIC (Video Interface Computer), Commodore introduced the product in Japan first, in mid-September . . . choosing purposely to "carry coals to Newcastle." The thinking was, if you want to find out how good a grade of coal is, you go to the experts . . . at Newcastle where coal is mined. If you want to find out how good a computer is, you go to the toughest consumer electronics market in the world . . . Japan.

The results were impressive. Orders for over 1,000 VIC's were taken the first day the computer was demonstrated at Seibu Department Store in downtown Tokyo.

Commodore's subsidiary in Japan started producing Japanese VIC's with Katakana/English keyboards, at the company's new plant in Osaka.

The VIC will be manufactured in the United States during 1981.

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## VIC 20 INTRODUCTION

Special application programs and games will also be available in plug-in ROM form, as well as on tape and disk media. Some of these programs will be designed by Commodore programmers, but the majority will come from outside software developers—individuals as well as software houses. Commodore is actively encouraging ROM-based program development, with excellent results.

Additional special features like the computer's built-in RS232C interface capability make it possible to use the VIC with a telephone modem for accessing telecomputing services such as "The Source" or communicating with other computers. Special interface cartridges will also enable the VIC owner to use a wide variety of peripherals now on the market.

### Documentation & Self-Teaching Materials
Commodore will provide excellent documentation for first-time users as well as software writers and computer entrepreneurs, in the form of books and manuals.

These publications will include innovative self-teaching materials which allow new and experienced computerists alike to explore their own special needs and interests . . . from basic computing to computer screen animation and use of the VIC in the classroom.

### Product Availability
The VIC 20 was officially introduced January 8-11 at the Consumer Electronics Show in Las Vegas. It is anticipated that the computer will be in full production by June, with VIC products sold not only through Commodore's existing authorized computer dealers but also through selected retail outlets.
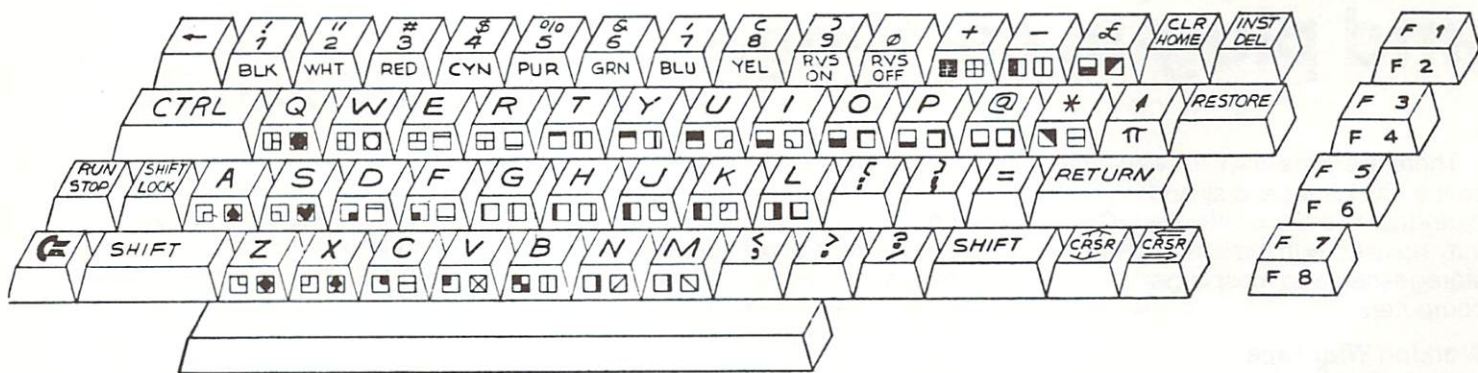
# A Tour of the VIC 20 Keyboard

It's difficult to convey in a one dimensional publication just how powerful a 3 dimensional computer can be, but a good way to get to know the VIC 20 personal computer is to take a quick tour of the keyboard.

The keyboard contains upper and lower case keys, numbers and symbols, just like a typewriter keyboard. In addition, there are special editing keys, and the famous "PET GRAPHICS" character set. Here then, is a brief "tour" of the VIC keyboard:

**GRAPHICS & THE COMMODORE KEY** — When you turn on the VIC, you're automatically in "graphics" mode which means you can type upper case letters AND the more than 60 graphics you see on the keys. There are two graphics on each key. To get the graphic on the right side, simply hold down the SHIFT key and type the key with the graphic you want. To get the graphics on the left side, hold down the "COMMODORE" key (the little flag). In this way, you can type upper case letters and the full graphics set at the same time!

**UPPER/LOWER CASE & GRAPHICS** — To get into the "text" mode you simply press the SHIFT and COMMODORE keys together. This lets you use the VIC like an ordinary typewriter, with full upper and lower case letters, plus all the graphics on the LEFT side of the keys. These are the graphics which are most suited for charts, graphs and business forms.

**COLOR** — You can change the colors of the characters you type by pressing the CTRL key and one of the 8 color/number keys. The colors are

black, white, red, cyan, purple, green, blue and yellow. You can set — and change — colors inside or outside a computer program. In addition to the eight character colors, you can also change the colors of the BORDER and SCREEN on your television set, by typing a special command called a "POKE." For example, if you type the command POKE 36879,(X where X is some number from 1 to 255), you can get up to 255 different combinations of screen and border colors, including 16 screen colors and 8 border colors.

**SPECIAL EDITING KEYS** — Here are some of the other special keys which make the VIC such a powerful microcomputer:

**CTRL** — used to set character colors, and, in conjunction with special programs such as wordprocessing, to execute special commands.
Software writers can select their own "Control" commands and incorporate them into their programs.

**RUN/STOP** — The RUN/STOP key lets you automatically load programs into the VIC's memory from a cassette tape. Hitting this key without shifting (i.e. STOP) interrupts a running program or listing. If you stop a program and want to resume it where you left off, you can type "CONT" and the program will "continue."

**SHIFT** — The VIC has two SHIFT keys and a SHIFT LOCK key, just like a typewriter, for typing long strings of upper case letters or graphics.

**RVS ON and RVS OFF** — These two keys let you type reverse characters on the screen (for instance

white on black instead of black on white).

**CLR/HOME** — This key makes the cursor move to the "home" position at the top lefthand corner of the screen. If you type SHIFT and CLR/HOME you "clear" the screen of all the characters that were present.

**INST/DEL** — This is a super editing key which lets you insert or (shifted) delete characters. It's great for correcting mistakes and inserting extra information.

**RESTORE** — This is a "reset" key. If you type the RUN/STOP key and the RESTORE key together, you completely reset the computer as if you just turned it on . . . with the benefit that any programs you had in the memory are retained and can be listed or run from the start.

**CURSOR KEYS** — Ability to move the screen cursor up and down and sideways by hitting single keys is a powerful feature of the VIC. Being able to move the cursor this easily is essential but not all computers include it as a feature.

**RETURN** — The RETURN key is used primarily for entering commands and instructions to the computer.

**PROGRAMMABLE FUNCTION KEYS** — One of the most unique features on the VIC is that mysterious vertical row of "function" keys on the far right side of the keyboard. There are four keys and (if you shift them) a total of eight functions. These keys are not defined when you turn on the computer, but you may assign any BASIC command or instruction set to them, under program control.

# VIC accepts tape, disk and plug-in cartridge

There are three ways to store data on the VIC 20: tape, disk and cartridge. In other words, the VIC 20 may be used with the same computer storage media as most larger computers.

### Working With Tape

The VIC comes equipped with a tape cassette interface which lets you plug a Commodore cassette tape unit directly into the computer. A new lower-priced VIC cassette unit will be provided, although the existing cassette unit which works with the PET/CBM can also be used with the VIC.

To demonstrate how easy it is to load and retrieve data on tape, you simply insert a standard tape cassette cartridge into your tape unit. If you have a program in the computer which you would like to "save," you simply type: SAVE "NAME OF PROGRAM". The screen will display: "PRESS RECORD & PLAY ON TAPE PLAYER" then, while the cassette unit is recording, it will show, "OKAY. SAVING (NAME OF PROGRAM)" on the screen. When it is done saving the program it will print: "READY" so you know it's done.

Thus, the VIC has a "brain" to help you along when you want to conduct a simple operation like saving a computer program you've written. Once a program is saved on tape . . . or if you buy a program already provided on tape . . . you can "LOAD" the taped program back into the computer by typing "LOAD" and hitting the RETURN key.
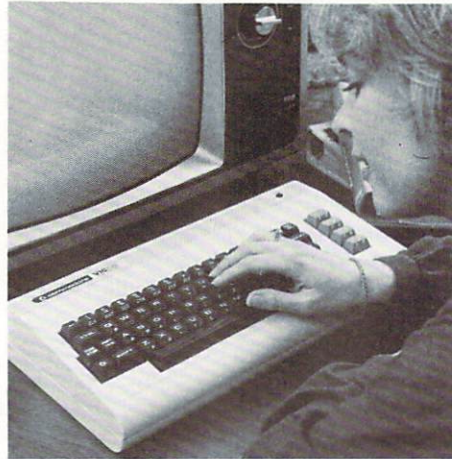
### Working With Disk

Most computer owners find they prefer working with computer disks because disks are much "faster" than tapes and can store more data.

Commodore will introduce a low-priced single floppy disk unit with 170 kilobytes of memory (for reference purposes one byte may be thought of as one character or space, so 170K means 170,000 characters of storage).

PET owners may write programs for the VIC on disk and run the disk in the VIC disk drive (recognizing that the programs must conform to the VIC's 22 character × 23 line screen format).

The VIC will also be able to use PET/CBM peripherals through a special IEEE interface card which will be available as an accessory. This accessory will allow PET owners to use the same IEEE PET/CBM peripherals for both PET and VIC products.

### Working With Cartridge

One of the unique features of the VIC is its ability to access programs on a plug-in cartridge. This cartridge might contain a game or instructional lesson . . . or it might contain a program into which you can feed data, get results . . . and then "save" those results on tape or disk.

The combination of cartridge based programs with tape or disk is especially powerful because it allows you to store large amounts of data on disk and change or process that data using the cartridge.

It is anticipated that two types of cartridges will develop . . . auto-starting cartridges which activate as soon as they are plugged in, and cartridges which must be "turned on" using some sort of access command.

### Storing Data

These methods of storing and retrieving data allow the VIC user to purchase existing software in a variety of standard formats, to create his or her own programs and store them, and to take advantage of the VIC's powerful cartridge option. This flexibility makes the VIC suitable for use by all levels of computerists, from novices to experienced programmers.

# DATAQUEST compares VIC 20, Atari 400 and Radio Shack Color Computer

## Commodore announces new Low-Priced Personal Computer

Commodore International last month announced its entry into the low-cost personal computer market with a $299.95 5-Kbyte color computer designated VIC (Video Interface Computer) 20.

The VIC represents a cooperative effort between Commodore semiconductor chip designers in the United States and the Company's systems engineers in Japan. Introduction of the new computer took place in Japan in mid-October, and Japanese response was extremely enthusiastic. Reportedly, orders for 1,000 VICs were booked on the first day of sales, despite the fact that a 25-percent down payment was required. The VIC will go on sale in the United States during March 1981, with European introduction to follow.

It is Commodore's intention to market the lowest-price full-power entry-level machine possible while also providing a piece of equipment that is highly expandable. The 5-Kbyte VIC 20, expandable to 32 Kbytes, seems to achieve this intention. In addition to its color capability and full-sized typewriter keyboard with programmable function keys, the VIC features a sound device, external expansion ports, and a 506-character screen display (22 characters by 23 lines). The machine is equipped with standard PET BASIC and a graphics character set for generating high-resolution graphics (176 × 184 or 32,384 pixels). Table 1 compares the features of the VIC with those of the Atari 400 and Radio Shack TRS-80 Color Computer.

In addition to the ability to externally expand memory to 32 Kbytes (with the additional 27 Kbytes possible in a variety of combinations of RAM and ROM cartridges), the following special expansion features will be available on the VIC at additional cost: voice synthesizer, joystick, lightpen, and game controller paddles. An RF modulator that enables the VIC to be directly connected to a television set is also included.

The external memory expansion and ROM program abilities of the VIC are especially interesting. Memory is expandable externally in a number of combinations of RAM and ROM, starting with a 3-Kbyte cartridge that contains space for additional ROM. The user can open up this cartridge and add ROM programs to it so that, in effect, a ROM program can be piggy-backed onto the RAM memory expansion. Commodore will also be selling these cartridges to software developers who will be able to package their own ROM programs into the

cartridge and resell it under their own lable to Commodore users. A user desiring additional RAM may procure a four-slot multiplexer to accommodate additional RAM cartridges in increments of 8 or 16 Kbytes. However total add-on RAM and ROM memory combined cannot exceed 27 Kbytes.

The VIC is intended as a bridge between the hobby market and the home-computer market and has been described by one Commodore spokesperson as a "sub-desktop computer" that fits between the desk-top and hand-held models in size, shape, price, and power, and with the potential of expanding to almost desk-top computer capability. It is aimed at several markets:

- The would-be computer hobbyist who could not heretofore afford a computer
- The first-time user who has been around computers or computer-like equipment as a time sharing or word processing user and who wants to gain some sophistication
- The primary education market that has previously found classroom computers too expensive

The first type of user will be able to bring some sophistication to his interaction with the VIC, while the latter two will find that Commodore has provided learning materials that are "friendly" to the novice.

—Ellen K. Clements
—Grant S. Bushee

| | Table 1 | | |
|---|---|---|---|
| **PERSONAL COLOR COMPUTER FEATURES SUMMARY** | | | |
| | **Commodore VIC 20** | **Atari 400 System** | **Radio Shack TRS-80 Color Computer** |
| Entry-Level Memory (RAM) . . . . . . . . | 5 Kbytes | 8 Kbytes | 4 Kbytes |
| Entry-Level Memory (ROM) . . . . . . . . | 16 Kbytes | 10 Kbytes | 8 Kbytes |
| Pricing . . . . . . . . . . . . . . . . | $299.95 | $630.00 | $399.00 |
| Maximum RAM Memory Expandability | | 16 Kbytes | 16 Kbytes |
| Maximum ROM Expandability | 32 Kybtes Total | 26 Kbytes | 16 Kbytes |
| **Features** | | | |
| Keyboard . . . . . . . . . . . . . . | Full Typewriter Keyboard | 57-Key Flat Panel, Touch Sensitive | 53-Key Typewriter Style |
| RF Modulator . . . . . . . . . . . . . . | Included | Included | Included |
| Communications . . . . . . . . . . . . | RS-232C Interface | None | RS-232C Interface |
| Sound . . . . . . . . . . . . . . . . | 3 Tone Generators (3 Octaves each) 1 Sound Generator; Uses TV Speaker | 4 Synthesizers (4 Octaves Total) Internal Speaker Plus TV | 256 Tones; Uses TV Speaker |
| Screen Display . . . . . . . . . . . | 22 x 23 (506 char) | 24 x 40 (960 char) | 32 x 16 (512 char) |
| Graphics Resolution . . . . . . . . . | 176 x 184 (32,384 pixels) | 320 x 192 (61,440 pixels) | 64 x 32 (2,049 pixels) Expandable to 256 x 192 (49,152 pixels) |
| Compatability with other Products Manufacturer | All Standard PET Software* | None | None |
| **Options** | | | |
| Joysticks . . . . . . . . . . . . . . | Yes | Yes | Yes |
| Rotary Paddles . . . . . . . . . . . | Yes | Yes | No |
| Light Pen . . . . . . . . . . . . . . | Yes | Yes | No |
| Plug-in ROM Programs . . . . . . . . | Yes | Yes | Yes |

*Subject to memory and display size limitations.     Source:  Commodore International, Ltd., Atari, Tandy Corporation

# VIC Cartridge provides software breakthrough

Early interest and response from software developers make it apparent that many software writers and programmers have been waiting and hoping for a product like the VIC, which lets them write "user friendly" programs whose operating systems and protocols are invisible to the user, and whose potential for day-to-day practical application is enormous.

Commodore is currently working with a number of professional software houses to explore creative new program ideas. The company will also encourage talented individuals/entrepreneurs to write more "user friendly" software and will take creative approaches in this area as well.

## Plug-In Cartridge for ROM-Based Programs

The development of a plug-in cartridge that will accept memory expansion RAM and/or ROM provides software developers with an exciting opportunity to "painlessly" enter the market for VIC software programs.

The VIC has been designed so 3K memory can be added to the computer's existing 5K by plugging the "3K Memory Expander" cartridge DIRECTLY into the VIC. But the 3K Memory Expander does more than add memory. It also has two empty ROM slots—which means that a software developer can put a program on ROM or EPROM and

have a ready-made Commodore product to plug it into.

This breakthrough circumvents the cumbersome "software development" systems that some companies charge up to $100,000 for. Commodore puts software developers directly into the cartridge business by providing a cartridge that accepts ROMs and EPROMs directly.

And VIC programs can be written in BASIC or machine code using a PET, then "downloaded" into the VIC. A special machine code monitor cartridge (machine monitor is not included in the VIC) and some further documentation is required for programming, but Commodore is making available a Software Development Kit which will include necessary hardware and documentation.

## Developing Software Cartridges

The VIC cartridge itself comes packaged in a plastic case which unscrews so a ROM/EPROM based program can be inserted by either the VIC owner or dealer. It is of course recommended that all ROM changes be made by authorized Commodore computer dealers.

Although Commodore has not yet announced a formal policy on software development for the VIC, there are three alternatives being explored for software providers who wish to write programs for VIC

cartridges:

1. Development of programs which Commodore will purchase and manufacture and sell as part of the VIC Cartridge Library or Commodore Learning Series.

2. Purchase of cartridges from Commodore for insertion of ROMS and relabeling as a proprietary product of the software developer.

3. Development of independently produced cartridges under license from Commodore following the Commodore cartridge design.

These, then, are the simple mechanics of producing cartridge-based software.

By way of further technical data, the VIC comes with 5K RAM memory of which approximately 3.6K is user accessible, allowing for color, sound and screen "nibble." The computer will accept up to 32K RAM or ROM in combination, which means that after subtracting the 5K RAM in the computer, 28K may be added externally in any combination of RAM and/or ROM.

The memory may be boosted 3K using the direct plug-in 3K Memory Expander Cartridge. To expand the memory further, a separate "Master Control Panel" with slots for memory expansion and program cartridges is required. The control panel will have its own power supply. The panel is still under development and will be available with 8K and 16K memory expander cartridges.

If the 3K Memory Expander is used, the RAM is boosted by 3K. This totals 8K RAM and leaves 24K, although the ideal program size is 8K or 16K. The benefits of a program as large as 8K or 16K cycling through 6.6K RAM (user accessible after screen) are obvious. It is recommended that programs be written in machine code to take maximum advantage of the cartridge and RAM capacity and the VIC's processing speed.

Questions relating to software development should be forwarded to VIC Software Director, Software Division, Commodore Business Machines Inc., 950 Rittenhouse Road, Norristown, PA 19403.

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### How to write Software for the VIC 20

Commodore is moving forward quickly with plans to develop, produce and manufacture cartridge-based software.

Toward this goal, the company is seeking superior programs for the VIC which fall into the following categories: games & recreation, home utility, education, and business.

All software and proposals submitted for consideration will be held in strict confidence. Programs may be submitted on tape or disk to run on the PET or CBM, for evaluation purposes (especially existing programs proposed for adaptation to VIC). All programs should bear appropriate copyright notice and the author's address and phone number.

Some examples of programs evaluated or accepted to date include: tax preparation, wordprocessing, chess, and information management.

Hardware proposals are also being accepted, particularly in relation to videodisk and energy control technologies.

Cartridge-based programs accepted by Commodore will be purchased or licensed and produced and sold through Commodore's worldwide marketing organization.

All inquiries should be addressed to: VIC Software Director, Software Group, Commodore Business Machines Inc., 950 Rittenhouse Road, Norristown, PA 19403.

# "Yes, but what can I do with it?"

We are entering an era where computers will be as widespread as automobiles and television sets. Not knowing how to use a computer will be like not knowing how to drive a car. We like to say that "not having a Commodore computer is like not having a telephone"—that's how certain we are that computers will soon reach the status of a home and office "appliance."

As a truly "personal" computer, the VIC fits comfortably into all environments—home, school and office—but to give you a better idea of what the VIC "does," here are some specific examples:

## Teach Yourself Computing

You don't have to be a computer programmer, or even a typist, to use a computer but it helps to have a working knowledge of what a computer is and what it can do for you.

One of the most obvious uses for the VIC is to teach yourself computing. Commodore has developed some innovative self-teaching materials to help you learn about your VIC, and about computing in general.

## Games and Recreation

It would be foolish not to recognize that personal computers are—in addition to their utilitarian uses—the most powerful "game devices" yet devised. There are hundreds of computerized arcade games which take you on exciting intergalactic journeys, and many of these games will be made available for the VIC 20, on easy-to-use plug-in cartridges.

One of these games is called "Invaders," and is similar to some of the computer games found in many arcades. A computer chess game will also be provided—adapted from what may be the most powerful chess game available on microcomputers. Truly challenging! Additional games include such standards as bridge, backgammon, etc.

## Educational Applications

It is anticipated that the VIC will follow in the footsteps of its big brother, the Commodore PET—the world's most widely used educational microcomputer. The VIC will undoubtedly be used by students both in and outside the classroom.

Students who've been using the PET in their classroom will find that their programming skills translate directly to the VIC 20, which uses the same programming language as the PET (with the addition of color and sound!), and incorporates the same famous "PET graphics" characters.

Given the lower price of the VIC, teachers will find that they can put more computers on student desks . . . and elementary and intermediate grade teachers will find that budgets which couldn't accomodate higher-priced computers can now include the VIC.

## Personal Computing in the Home

One of the first "home" computer programs to become available for the VIC is a home tax preparation system. This easy-to-use system will include a special plug-in cartridge which asks you a variety of questions and prepares your current federal tax returns based on the answers. A new cartridge will be provided each year to account for changing tax regulations.

Home budgeting is another area which will be addressed. By entering your monthly expenses and allowances into the home budget system, you can accurately determine what your future savings will be, how much you will have for "emergencies," even whether you can afford that new car or vacation next year, and when!

Several other home application cartridges are currently being developed by Commodore and will be announced as they are tested and made available. It is Commodore's intention to concentrate on practical home applications which take full advantage of the VIC's computing power and convenience, with special emphasis on programs which help fight inflation, conserve energy and provide more time and convenience for the user.

## Computerized Energy Control

Commodore entered the energy electronics field during Fall 1980 with a unique electronic programmable thermostat which regulates heating and air conditioning temperatures for a savings of up to 30% in home and office fuel costs.

It is expected that Commodore's continuing emphasis on energy control electronics will result in adaptations for the VIC which allow the user to "computerize" such things as lighting and temperature control and other aspects of home energy consumption which can result in significant cost savings.

## Telecommunications

One of the VIC's most powerful features is its ability to use any television set as its "computer screen." If we take this marriage of technologies one step farther, we can attach the VIC to a telephone via a modem (a device for translating computer signals into telephone signals and vice-veras) and tie in our computer to a telecomputing service.

Wouldn't it also be nice to be able to call up a local telephone number and get a rundown on all your current stock market investments, and punch up individual news stories on the companies you've invested in? This service is being made available by Dow Jones.

## Business Applications

The VIC's full-size typewriter keyboard, special screen editing keys and lowcost peripherals will undoubtedly result in the computer being used by small businessmen, primarily as an intelligent terminal but quite probably in more creative roles as well.

For example, the VIC is compact enough to fit snugly into a briefcase. A salesman might carry a VIC with him on the road, record data as he travels and report the results back to his home office through his computer, over the telephone.

The VIC might be taken to the site of a disaster to help record statistics for emergency and relief purposes.

## The Future of the VIC

What specifically can you do with the VIC 20? How will it improve your lifestyle, or save you money, or contribute to your welfare and convenience? There isn't room in this article to cover all the possibilities. All we can do is make it available with as many suggestions as possible, and let you adapt the computer to your own needs—you may even invent some new applications of your own!

# Questions and Answers about the VIC

**What does VIC stand for?**
VIC stands for "Video Interface Computer." It derives from the "Video Interface Chip" developed by Commodore's MOS Technology semiconductor subsidiary. The VIC is designated VIC 20 in the U.S. and VIC 1001 in Japan.

**What peripherals and accessories will be available with the VIC and when will they be on sale?**
Commodore will introduce a full line of accessories and peripherals which will make the VIC computer a total low-priced "system." A list of peripherals is included on page 4 of this publication. Most of these items will be available during the last six months of 1981.

**Do I have to buy anything "extra" with my VIC?**
You can start using your VIC immediately. The user's manual which accompanies the computer contains several sample programs to try, and instructional material to help you get started. The next step is to purchase Volume 1 of the VIC Learning Series, which includes a book and plug-in cartridge which "introduce" you to computing on the VIC. Additional cartridges are available, and as you get further into computing you will undoubtedly want to acquire a tape cassette unit or disk drive to store programs and data, and perhaps a paper printer. Note that the standard Commodore type cassette recorder can be used with the VIC 20.

**Where can I buy a VIC and how soon?**
VIC's will be sold through authorized Commodore computer dealers and selected retail stores. It is anticipated that VIC's will become available in quantity during April-June 1981, with most peripherals available at the same time or shortly thereafter.

**What kind of warrantee comes with the VIC?**
A 90 day over the counter exchange warrantee is provided—in other words, if the VIC fails to operate due to a factory defect within the first 90 days of purchase, you can return the VIC to your dealer for an over the counter exchange.

**How do I get my VIC repaired beyond the warrantee period?**
Your VIC can be repaired by a Commodore computer dealer or authorized service center. Commodore is in the process of setting up a national service organization which will provide local service for all Commodore computers, including the VIC.

**Is the VIC compatible with the PET/CBM?**
Software for the VIC may be written on the PET/CBM, in BASIC or machine code, and transferred to the VIC via tape or disk. However, VIC programs written on the PET/CBM must conform to the VIC's 22 character screen width and cannot exceed the VIC's available RAM memory. PET lines longer than 22 characters will "wrap" around and not produce the same image on the VIC. The VIC may be used to write 40 and 80 column programs for the PET/CBM if color, sound and other commands unique to the VIC are avoided.

In terms of peripherals, the VIC, PET and CBM all use the same tape cassette so tapes are transferable. PET/CBM disk drives and printers may be used with the VIC if an IEEE interface cartridge is attached to the VIC. A low-priced single disk drive unit will be made available for use with the VIC, and a low-priced dot matrix printer is also anticipated.

**Do I need an RF Modulator or other device to connect the VIC to my TV?**
The VIC will come with an RF modulator included. An external power supply and video cable are also included.

**Can the VIC be used with a modem?**
An RS232C interface is built into the VIC, which enables the computer to be used for telecommunications purposes, using a Commodore "RS232C Interface Cartridge."

**Who Will Use the VIC?**
It is anticipated that the VIC will be used by many people to teach themselves about computing—to help them prepare for the increased use of computers not only in business and science, but also in home and school environments.

Students using the PET in their classroom will find it easy to use the VIC at home or in school, since the VIC uses the same BASIC computer language and graphic symbols as the PET. (Market researchers estimate that the PET is used in more schools worldwide than any other microcomputer.)

A variety of small business programs will be provided during 1981. Businessmen may want to use the VIC as a "portable" computer, since it fits snugly into a briefcase and connects to any television. The VIC also works with a modem and may be used as a telecommunications device.

Engineers and hobbyists will undoubtedly find a variety of new uses for the VIC, as they did with the VIC's big brothers, the PET and CBM. Although the VIC comes with a serial bus instead of an IEEE bus, a special interface board enables the user to connect the VIC to IEEE devices and control instruments and mechanical devices through this connection.

The most obvious VIC users will be hobbyists . . . avid computerists who perhaps own a PET or CBM and would like to have color and sound . . . or hobbyists who couldn't afford a computer before, but now can get started at $299.

# Robbinsdale Schools Adopt PETs

## PET MICROCOMPUTERS IN EDUCATION

*by Bill Heck*

Commodore PET microcomputers, 8K and 16K, are being used extensively in the Robbinsdale, Minnesota school district. Here is the Robbinsdale story:

Microcomputers in Education is a three-year development project funded by a Title IV-C federal grant. The main focus of the project is to develop and classroom-test microcomputer programs for the elementary school curriculum. The second and third years of the project will also be used to research the effectiveness of the programs.

### PROJECT GOALS

Development: To develop and classroom-test computer programs for the elementary school curriculum.

In-service: To develop and provide in-service training for the staffs at 15 public and 3 non-public schools in the district.

Implementation: To develop a system for providing and maintaining computers, programs, and program documentation.

### PROJECT HARDWARE

60 — 8K Commodore PETs

10 — 16K Commodore PETs

2 — 2040 Disk Drives

3 — Printers

1 — 32K Commodore PET

1 — 8050 Disk Drive

1 — Apple II with Disk

1 — TRS 80 Level II 16K

### PROJECT SOFTWARE

Software programs have been completed for use in elementary classrooms in the following areas: mathematics, science, language arts, foreign language, reading, career education, music, spelling, and special education.

### Software Development

A key feature of the project is developing and testing computer programs for use in elementary schools. These programs are designed to make the computer an instructional device for use in the classroom by the teacher. Ideas for programs generally originate with the classroom teacher. The project director, Bill Heck, and facilitator, Dick Maus, with possible assistance from the relevent subject coordinator, expand and further define the programs in sufficient detail so the programmers can complete the programs.

When a program is completed, it is classroom-tested by key teachers in a minimum of three of the 18 schools. Revised programs become a part of the media center of each school.

### In-Service

Each elementary staff person at the 18 sites attended two half-hour in-service sessions. This in-service included topics on computer literacy, an explanation of the project and its goals, and demonstration of a sample of some completed programs.

One key teacher from each site participated in two half-day workshops. During these half-days they were shown new programs and met with the project director and the facilitator. Eight 16-hour in-service classes were held for approximately 60 staff people. Of the 16 hours, approximately 8 hours were used to introduce the teachers to programming in BASIC. The other 8 hours were spent in lab activities related to loading, saving, using, and modifying existing software.

### Implementation

A fundamental concept of the project is that computers should serve as classroom instructional aids for the teachers and students. To accomplish this, the programs must be relevant, interesting, and easy to use. One nice feature of the Commodore PET is its ability to prevent the student from "breaking out" of the program. The PET tape operating system has proved

## PET MICROCOMPUTERS IN EDUCATION
### (continued)

very dependable and the one- to two-minute load time becomes insignificant when a program is loaded and used in turn by 10 to 30 students for an hour or two, or possibly all day.

The media center is generally considered the "home base" for each computer. The teachers check out and move the machines to their classrooms as they would a tape recorder or any other piece of equipment.

## HARDWARE

In the two years prior to the start of the project, the school district purchased one APPLE, two Commodore PETs, two OSI, and one Radio Shack TRS-80 Level II 16K Computers. The computers were evaluated relative to each other and compared with the time sharing computer used via the telephone. Since these computers are purchased by the district with no maintenance contract, cost and dependability were important considerations. Future expandability, program capabilities, and general ease of use also had to be considered. At this time, the PET is the favored computer. The district now owns 60 PETs with 40 8K PETs used within this project.

## PROGRAM CLASSIFICATION

A basic assumption within the project is that the computer can support and supplement instruction at all grade levels and in any subject area. Programs usually fall into the classifications of drill and practice, simulations, or tutorial.

### Drill and Practice

The computer can provide endless practice in any chosen area. It can randomly select items from a list such as a spelling list or it can randomly generate addition, subtraction, multiplication, and division problems at many levels. Given exercises can be timed as well as a summary given. Most programs are in this category.

### Simulations

This type of program attempts to duplicate some real situations. One very popular program is called "Oregon", which simulates a trip to Oregon in the year 1847 with the computer randomly generating various situations that could occur: bandits, hunting for food, etc. Simulations have great value in that problem-solving and decision-making can be required of the user. One can also bring to the classroom situations which otherwise would not be possible.

### Tutorials

Drill and practice, simulations, and tutorials may overlap in some programs. A drill and practice program that allows hints when incorrect answers are given has some tutorial aspects. Another type of tutorial is one that provides instruction with student interaction coming throughout the tutorial or at the end of the tutorial program.

## INSTRUCTIONAL CONCEPTS

Along with the exploration of computer uses in all elementary school subjects, various kinds of instructional concepts have been examined. A description of these concepts follows:

### Kid Proofing Programs

A basic philosophy of the project is that the computer should be used in the classroom by teachers and kids. Most of the programs developed within the project contain features which make it impossible to get a computer system error message. Through some subroutines within the programs, the stop key on the PET computer is disabled and the input characters controlled.

This insures the teacher that students cannot accidentally exit the program or disturb the screen display.

### Personalization

Initially, giving the computer human characteristics seemed desirable. After several months of usage it now seems more desirable to view it as a machine. Statements such as "I like you" and "thanks for working with me" have all been deleted from the programs. This type of personalization takes up space and offers nothing instructionally. At first it also seemed desirable to have the computer ask "What is your name?" and to use the name throughout the program. However, after using several programs with this feature the student tended not to respond with their name but with undesirable words. Our present programs make reference to students by "Player 1" or some other technique controlled within the program.

### Positive Reinforcement

Positive reinforcement can be done in many ways, from using simple words to showing something spectacular on the screen. If possible, some reward should be given. Too frequently the reinforcement for a correct answer seems to be the next problem. It is also necessary to minimize what may occur in response to an incorrect answer. If something quite spectacular happens when an incorrect answer is given, students will purposely get wrong answers. The programs do not reinforce incorrect answers in any way.

### Program Duration

Several concepts were examined and used. Some programs never end. The computer randomly selects items for use and continues to do so until the computer is shut off. Teachers like this concept particularly at the kindergarten through third grade levels. Students work at the computer for a specified time limit. Some of the programs are set up to give a specified number of items, usually ten. Other programs allow the teacher or student to select the number of

[1] **in·ter·face** \ int-ər-fas\ v 1: the transfer of information through a common boundary⟩ 2: to connect by means of an interface
[2] **interface** n 1: the means by which communication is effected at an interface⟩ 2: *a magazine published by Commodore Business Machines, Inc. providing a means of communication across a common boundary between the manufacturer and CBM computer users.*

# CE commodore **INTERFACE** Application Form

Name: _____

Address: _____

City _____ State _____ Zip _____

Renewal Subscription _____ New Subscription _____

My subscription Began With Issue Number _____

Enclosed is a check or money order for $ _____

for _____ Issues of the Commodore Interface

Make Check payable to: **COMMODORE BUSINESS MACHINES, INC.**
681 Moore Road
King of Prussia, PA 19406
Attn: Editor, Commodore Interface

**Ｅcommodore**

# INTERFACE

## PET MICROCOMPUTERS
## IN EDUCATION
### (continued)



items. A summary is usually given at the completion of these programs.

### Whole Class Involvement

Although most computers and computer programs are meant to be used by one or two individuals, there are times when working with an entire class is desirable. A computer at each school site has been equipped with an output jack so that one or more large video monitors can be used. A program can then be introduced to a whole class or used with the whole class as an instructional activity.

### Programs Requiring One, Two, Three and/or Four Students

Most programs seem to be written for a single student. Two or more students may use such a program by taking turns. An additional concept is to write programs requiring two, three, or four students. Positive feedback has been received from teachers regarding programs requiring more than one student.

### Game Aspects

Students seem to prefer some kind of a game context. Two types

have been used within the project. One allows students to participate in a game after giving the correct answer. The second is to put the instruction or practice within a game format. The second type of game context is preferred.

### Competition Between Students

A game situation involving competition between students is quite popular. Techniques have been explored which would allow two students with different abilities to use the same program. Programs involving competition can be used with small groups or the whole class for discussions or decision-making.

### Cooperation Between Students

The concept of cooperation was built into a program in the following way. Two students are given a time limit to alternately give correct answers to math facts. Each time a correct answer is given, a part of a rocket ship appears. If they can complete the rocket ship within the alloted time, it will fly. If not, the ship disappears and they must start over.

## SOFTWARE

The project had as one of its major goals the development and classroom testing of 80 computer programs for the elementary school curriculum. This has been accomplished. Programs developed by category are as follows:

### PET

Math — 45
Social Studies — 7
Science — 2
Directory Program — 5
Reading, Language Arts — 17
German — 2
Library — 1
Music — 1
Spelling — 9
Careers — 2
Special Education (Individualized Educational Prescription) — 6

### APPLE

Math — 5
Reading, Language Arts — 3

The PET programs run on any 8K PET while the APPLE programs have been used with a 32K machine. Documentation sheets have been developed for each program with the following information:

1. Program Data

2. Description

3. Any directions appearing in the program

4. Sample run

These programs are now available for distribution.

# Meet OZZ - the Information Wizard

Ozz-The Information Wizard is an intelligent information retrieval system that gives you the freedom to tackle your problems in your own way. Whereas normally, a customer who asks for a specific application has to compromise with standard software (or pay the price of custom programming) Ozz is a program that can be adapted to many applications within a few minutes by a non-programmer. It has intelligent features that let you decide its working parameters. You choose what information to store, what calculations to make, and how reports and lists are printed. Even if you've never been near a computer before, the Wizard will help you set OZZ to meet your individual requirements.

## OZZ APPLICATIONS

OZZ is invaluable in any professional environment, be it business, engineering or science. Some of the fields where the Wizard can help include:

- -- Inventory Control
- — Management Information
- — Mailing List
- — Appointment Scheduling
- — Medical Record Keeping
- — Library Systems
- — Accounting
- — Invoicing
- — Cost Analysis
- — Materials Control

## SETTING UP FORMATS AND STORING INFORMATION

A data base editor defines the information to be stored and how it is to be displayed on the screen. Ozz does not limit the user to a preset format. The user designs his own record layout in much the same way as one would draw up a standard form on paper. An information box or field is drawn upon the blank screen for each item of information you wish to include. These boxes define the physical boundaries for each item, and can be labeled with an appropriate field name or title identification. From the form you've drawn, OZZ interprets the nature of the information to be

stored and opens a corresponding information file. The blank form is recorded in the system and can be called up at will. A curser automatically appears in the first block. Striking the return key moves the curser to the next block. Information is entered simply by filling in the appropriate boxes on the form. You can define and record up to ten forms in this way and so create up to ten different information files. All file management is handled automatically by OZZ. Each file grows in size as additional information is entered, thus using all available capacity to its fullest.

## SEARCHING FOR INFORMATION

Stored information can be retrieved very quickly in either of two ways: by computer allocated number (relative record number), or by key field. You can also peruse either forwards or backwards through an information file in numeric or alpha-numeric order. A fast search facility allows OZZ to search through a file for a particular piece of information. For example, if you told OZZ to search for the word "BRISTOL", OZZ will hunt through the file and display on the screen any record containing the word "BRISTOL".

## CALCULATIONS

OZZ has a unique programmable calculator that performs arithmetic operations. This calculator is very simple to use as it is programmed entirely in plain language. You can enter, for instance, commands like "INVOICE TOTAL = GOODS TOTAL + POSTAGE".

## PRINTING DOCUMENTS

A document editor defines the content and format of reports, lists and other printed information from the files. This document editor is a special form of word processor and you can indeed use it as one. The content and format of the document to be produced is displayed on the computer screen. You may alter the content and format of the document and insert additional text at will, thus providing total control over the final printed result. The document editor may be used in conjunction with the programmable calculator to print calculated results. Document formats may be stored for future use.

## ANALYZING INFORMATION

OZZ provides you with sophisticated facilities to analyze the information held on any file. You can base your analysis on any number of criteria (less than, greater than, equal to or a combination of all the above). For example, a commercial user can produce a list of all customers living in town X with an outstanding balance greater than Y and the total business conducted with them over the past year. Such facilities are of particular value for management information and experiment analysis.

## MEET OZZ – THE INFORMATION WIZARD
(continued)

### OZZ–THE MANUAL

A detailed instruction and reference manual is supplied with every OZZ system. This manual is written to be easily understood, even by people with absolutely no experience with computers, and contains numerous illustrations and worked examples.

### OZZ–HARDWARE REQUIREMENTS

OZZ is designed to run on a Commodore 8032 computer together with a Commodore printer and one or more Commodore 8050 disk units. Exact file capacity will depend on the number of disk units used in the system. Please consult your dealer for advice on the best configuration to meet your requirements.

## OZZ PROGRAM SPECIFICATION

Program language — Machine code

RAM requirements — 32 Kbytes

Max. No. of files in database —10

Max. record size — 252 bytes

Min. record size — 1 byte

Max. No. of records in each file — 64,000 or to fill disk capacity

Record structure — User defined

File Structure — Direct access/dynamic allocation

Record access — Relative number/keyfield/sequential search

Calculator precision — 14 digit max.

Calculator functions — Addition/subtraction/multiplication/division/percent

Calculator program — Plain language

Calculator programmable steps — 16 max.

Calculator output — User defined — right justified

Print output — User defined

Max. print page length — 76 lines

Print headers and footers — Automatic

Max. No. of print formats stored — 10

Select/analyze criteria — multiple. Greater than/less than/equal to based on full record mask

RETAIL PRICE $395

# WORDCRAFT 80 COMMODORE WORDPROCESSING SYSTEM

Most businesspeople accept that the cost of producing typed paperwork is becoming a significant item in their office expenditures. And the rapid acceptance of Word Processing machines is a direct result of the escalating costs of typed material.

However, there are many areas of business that cannot consider the major investment required to install dedicated Word Processing equipment: smaller organizations, departments employing only 1 or 2 secretarial people, laboratories, branch offices, etc.

WORDCRAFT 80 is a professional Word Processing program that converts a very low-priced microcomputer system into a full-fledged Word Processing machine. The microcomputer system is the Commodore CBM using a 80-column screen and twin floppy disk drive unit with a capacity of 80 to 100 pages of text.



Consider these features:

1. Page layouts of up to 117 characters wide by 98 lines deep.

2. Screen displays finished format of document, no wraparound.

## WORDCRAFT 80 (cont'd)

3. Handles tabs, indentations, decimal tabs and columns.

4. Automatic centering and right margin justification.

5. Headers and trailers on each page as well as automatic page numbering, even book-fashion (alternative left-and right-sided).

6. Character, word, and paragraph deletion and insertion.

7. Block movement of text from one page to another.

8. Automatic merging of standard blocks of text to form documents.

9. Merging of standard letters with name and address files.

10. Handles single sheets or continuous stationery.

11. Half line movement for subscripts and superscripts.

12. Character string search.

13. Indentify and/or replace automatic underlining and emboldening of text.

WORDCRAFT is compatible with many of the letter quality printers and is fully supported by a nationwide Dealer network as well as comprehensive operating manuals.

WORDCRAFT 80 retails at $395; a complete system with letter quality printer could cost as much as $7,000 to $13,000. A low cost Commodore Business System (computer, disk drive and letter-quality printer) combined with Wordcraft 80 provides a sophisticated word processing system retailing for approximately $5,000. And, of course, the system can still run the many business computing programs that are so readily available for the Commodore Microcomputer System.

Hardware requirements are:

— Model 4032 or 8032 computer

— Model 4040 or 8050 disk drive

— Model 2022 or 4022 Commodore printer or Commodore compatible letter-quality printer.

Available from Commodore dealers.
RETAIL PRICE $395

# VISICALC™
## NOW YOU CAN TURN YOUR COMPUTER SCREEN INTO A GIANT "ELECTRONIC SHEET"

Commodore recently announced the availability of Personal Software's VisiCalc program developed for its line of 32K microcomputers. With this software, and either the 4040 or 8050 disk drive, the user can put VisiCalc to work generating financial studies, profit models and a score of other applications with only a fraction of the time and effort of manual operation. This program is one of the most popular software products in the microcomputer industry. It is widely used in business and school environments.

The VisiCalc program generates a giant, two-dimensional electronic sheet. On this sheet, you can record values, calculate them with predetermined formulas, and report them to a printer. Actually it is very much like a calculator with two exceptions: (1) it stores the figures for review, and, (2) if you decide to change a value, it remembers the formula and automatically recalculates the answer.

For example, if you want to project your annual sales and costs under a manual method, you would lay out twelve months across a spread sheet and then fill in the lines and columns with your projected figures. Many of those figures in a given month such as phone bills, inventory and travel expenses, could be calculated as a percentage of monthly sales. Each time you wish to change one of those figures, you would have to first recalculate it. Under VisiCalc, you would simply enter the formula for the calculation in the appropriate column and, each time one of the entries was changed, the entire column would be recalculated.

VisiCalc is available for both the 40-column and the 80-column Commodore systems. The 80-column system gives the user the added benefit of doubling the number of columns displayed on the screen compared to conventional 40-column screens found on most microcomputers.

VisiCalc has many possibilities for use in business, engineering, and even personal use. Many users find that VisiCalc alone is justification for owning a personal computer.

# TWO NEW TAX PACKAGES

### FEDERAL INCOME TAX PACKAGES

Commodore is pleased to introduce two new income tax packages, one for CPA/professional tax preparation, and the other for the individual home preparer.

### FEDERAL INCOME TAX PREPARATION SYSTEM

The FEDERAL INCOME TAX PREPARATION SYSTEM is designed for the professional tax preparer. The system gives the professional a means to handle a large number of client tax returns easily and accurately.

The 1980 FEDERAL INCOME TAX PREPARATION SYSTEM includes:

> Form 1040 Front
> Form 1040 Back
> Form 1040 A
> Schedule A
> Schedule B
> Schedule C
> Schedule D
> Schedule G
> Schedule TC
> Schedule SE

Included with the FEDERAL INCOME TAX PREPARATION SYS-TEM are the New Jersey and New York sales tax tables. Other state sales tax tables can be created by the user when necessary.

The FEDERAL INCOME TAX PREPARATION SYSTEM allows for the printing of the various Federal and State tax forms. Depending upon the printer configuration, single sheet IRS forms (friction feed), three or four part snap-apart forms, or continuous feed forms may be utilized.

The FEDERAL INCOME TAX PREPARATION SYSTEM is ideal for a wide range of individual businesses:

1. The speed, adaptability and accuracy of the FEDERAL INCOME TAX PREPARATION SYSTEM will allow the tax professional to increase his efficiency and take on new clients eliminating the need for time-consuming manual preparation systems.

2. The financial professional can earn additional income by developing a tax clientele and processing their returns with the FEDERAL INCOME TAX PREPARATION SYSTEM.

3. The realtor, lawyer or banker can bolster his firm's first quarter earnings by reallocating some of his resources for tax preparation.

The suggested retail price is $495.

### PERSONAL TAX CALCULATOR

The second tax system offered by Commodore is the PERSONAL TAX CALCULATOR. This software allows the home tax preparer to calculate his own 1980 income taxes. This system does not have the printing or storage capabilities of the FEDERAL INCOME TAX PREPARATION SYSTEM, but allows the individual to automate his tax calculations.

The PERSONAL TAX CALCULATOR can process the following forms:

> 1040
> Schedule A
> Schedule B
> Schedule TC
> Schedule G

The suggested retail price is $69.95.

# Adding Sound to Your PET
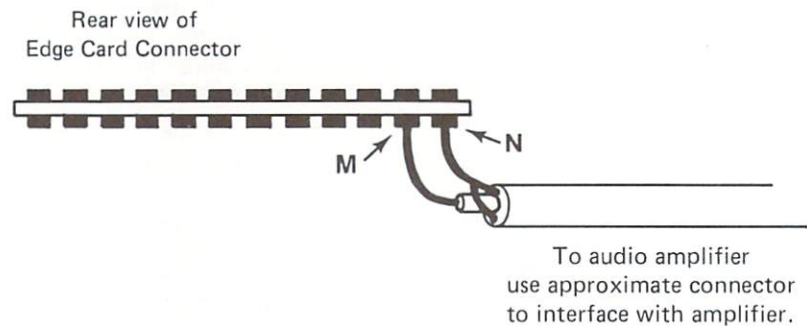
*by Dave Moyssiadis*



User Post
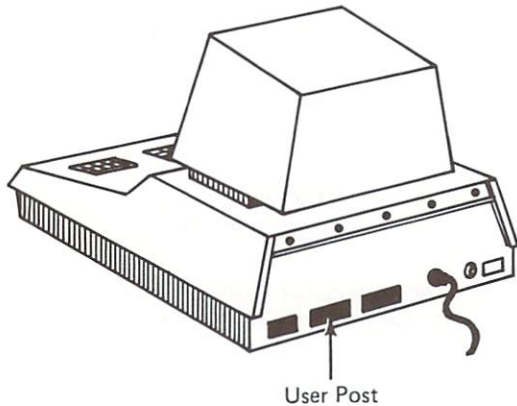
With a little hardware and a little software you can add sound to your PET and add a new dimension to such things as games. (Space Invaders is even more exciting with sound.) If you are not handy with a soldering iron you can get an edgecard connector from your dealer and hook the User Port up to your stereo system.

For the brave souls who do not cringe at the sight of a screwdriver, you will need a soldering iron, solder, and edge card connector available from your dealer and a suitable length of coaxial cable (the same stuff your stereo system is hooked up with) and the appropriate connector to input to the audio amplifier of any stereo system. Now take a look at the back of your PET and note the three edge connectors at the rear. (Fig. 1) The one on the left is the cassette interface. The one in the MIDDLE is the one we are interested in — not the one on the right which is the same size. There are a total of 24 connections on this edge, 12 on top and 12 on the bottom. On the bottom side there are pins 'M' and "N". (You may want to look at your manual under PET COMMUNICATES WITH THE OUTSIDE WORLD.) This will give you detailed diagrams of these connectors.

The "M" and "N" pins are the two on the lower right side as you look at the rear of the PET right side up. "N" is the ground or shield side, and "M" is the signal connection or center conductor. Solder the edge card connector in this manner (Fig. 2) and be very careful about your work. You are fooling around with the 6522 chip which is the most expensive one on the mother board — and you can burn it up very easily. Before you plug anything in check your solder connections and cable to make sure there are no shorts either directly between pins M and N or in the patch cord you have just made. Then you can make your connections and start up the PET and your amplifier.

Now comes the software part. Key in the following program:

```
10 POKE59467,16
20 POKE59466,15
30 FOR X=1TO255
40 POKE59464,X
50 NEXT
60 FOR X=255 TO 1 STEP-1
70 POKE59464,X
80 NEXT
90 GETA$
100 IFA$<>"S"GOTO30
110 POKE59464,0
120 POKE59466,0
130 POKE59467,0
140 END
```

After you key it in and run it, press "S" to stop the noise. What you should hear is a siren type sound. Next, change lines 30 and 60 to read POKE 59455, 151 and run the program. Again press the "S" key to stop.

This is what is happening: POKE 59467, 16 turns on the sound, 59464 changes the pitch of the sound and 59466 changes the quality or timbre of the sound. Legal values are from 0 to 255 as with any POKE command. Experiment with different POKE values, to get different sounds. Note that POKE 59464, 1 is a high pitched sound and POKE 59464, 255 is low. Also

Rear view of
Edge Card Connector



To audio amplifier
use approximate connector
to interface with amplifier.

POKE 59466, 1 is a sharp sound and POKE 59466, 255 is dull. One note of caution: You MUST turn off the sound completely by setting all three pokes to 0 before you can use the cassette LOAD or SAVE. Even if you do not hear sound you must still POKE everything off. Otherwise you will not be able to SAVE a program or to LOAD a program.

# BASIC, Machine Code & Assembly Language

## AN INTRODUCTION

*by Emily Berk*

The following article presents an introduction to machine and assembly language code - what they are and why they are used. Included is a program that will demonstrate the speed advantage of machine language programming, and also, the difficulty of programming in numeric code.

A computer is an intricate maze of on-off switches. As such, it can do only two things in response to commands — it can turn switches off and it can turn switches on. The only way the first computer programmers could command the earliest computers was, in fact, to turn some of those switches on and others off. These days, the programmer has a variety of languages in which to tell the computer what to do. But at some level, in order for the computer to understand what is desired, the programmer's language is still converted to impulses that turn switches on and off.

### High Level vs. Low Level Languages

High level languages — languages such as FORTRAN, BASIC, and PASCAL — are programming languages that have been developed to mimic human language. They are, therefore, easy for humans to use. In order for the computer to understand such a high level language however, it must be translated into the 1's and 0's (binary representation of numbers) that the computer understands. This translation is accomplished through the use of a translating program, a compiler or interpreter. It is the BASIC interpreter that comes hardwired into your Commodore computer that allows you to program your computer in BASIC. Additional compilers and interpreters can be purchased and loaded into your computer allowing you to program your computer in the high level language of your choice. Using high level languages simplifies the programmer's task, but he pays a price for this convenience.

Because of this translation process, and the inefficiencies it induces, high-level language programs run more slowly and take up more space in memory than do programs written in the computer's own language — machine language.

The machine language of a particular computer is determined by its microprocessor. (Commodore computers use 6502 machine language because they are driven by a 6502 microprocessor.) Machine language is transmitted to the computer as ones and zeroes, which are then interpreted by it as high and low voltages on its wires. Assembly language is a way of expressing these same binary values using mnemonics (symbolic representations of an instruction). Although nearly every assembly language command corresponds one-to-one with a machine language instruction, the computer will not understand them until they too are converted to binary code. The program that translates assembly language programs into machine language is known as an assembler. Assemblers are much simpler and more efficient that the compilers and interpreters that translate high-level languages into machine language because of the one-to-one relationship between assembly language instructions and machine language instructions.

### Machine & Assembly: What They Look Like

The machine language representation of the 6502 instruction to "load" information into the accumulator is:

10101001 (binary)

The machine language instruction to move the value 21 (decimal) to the accumulator is:

10101001 10101 (10101 is the binary notation for the 21 decimal)

An assembly language mnemonic equivalent to the BASIC command "load" or machine command "10101001" is:

LDA

Thus the assembly language instruction that will move the value 21 (decimal) to the accumulator might be written as:

LDA #21

Not only is the mnemonic, LDA, easier for a programmer to remember than the number 10101001, but it also looks like what the command is meant to do.

### A Programming Example

The following program will graphically illustrate the speed advantage of a program written in machine code. Imagine that the computer is controlling an experiment and periodically reads five results that can range between 5 and 35 from an instrument. It then logs them into memory. A simple horizontal bar chart is required so that the user can keep an eye on progress, but the computer must be "off-line" to the experiment for as short a time as possible.

Lines 10 through 80 contain the BASIC routine that reads the results and draws the bar chart. Lines 90-160 allow BASIC to store a machine language program (starting at location 826) that can then be executed by typing SYS826. Lines 140-160 contain the machine code equivalent of lines 10 through 80. The machine code used here is written in decimal because the BASIC interpreter will convert the decimal to binary before storing the numbers in memory.

```
10 S=32768
20 FOR X = 5 TO 0 STEP - 1
30 A = PEEK (870+X)
40 FOR Y=ITOA
50 POKE S+Y,102
60 NEXT Y
70 S=S+80
80 NEXT X
90 AD = 826
100 READ Q$
105 IF Q$ = "*"THEN STOP
110 POKE AD, VAL (Q$)
120 AD=AD+1
130 GOTO 100
140 DATA 169,0,141,76,3,169,128
142 DATA 141,77,3,160,5,190,102,3
144 DATA 169,102,157,200,128,202
150 DATA 208,250,136,48,17,173
152 DATA 76,3,24,105,80,141,76,3
154 DATA 144,231,238,77,3,76,70,3
160 DATA 96,10,15,20,25,30,35,*
READY.
```
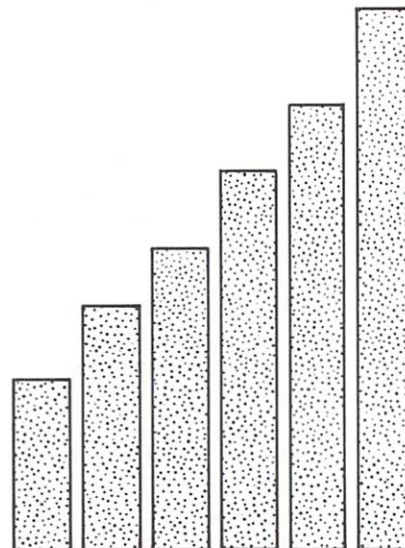


Type RUN and see the BASIC program draw the bar chart. Now clear the screen, move the cursor down several places, and type SYS826. The speed advantage of machine code is quite apparent. You can also see that the machine language commands used to generate the chart are incomprehensible to a human being who does not have the key — a knowledge of machine language commands. This program is also difficult to debug for the same reason. There is nothing in the machine language part of the code like a Basic REM statement that tells the programmer what it was that he intended to do at any particular point. So, three months after he writes this program, when he decides to make a slight change, the programmer will have to rethink the entire algorithm to figure out what each command does and how it can be changed.

## SYS & USR:
## A Compromise

The compromise many programmers decide on is to write as much of the code as they can in Basic, but to branch to machine language subroutines to perform time-critical portions of code. This type of compromise is facilitated by two Basic commands, USR and SYS.

The SYS command is analogous to the BASIC GOSUB command. Its format is: SYS (addr), where addr is an integer or integer expression between 0 and 65535 that specifies the location of a machine language subroutine the programmer has stored previously. Return is effected by a Return to Subroutine machine language command.

The USR command is analogous to a function call — with USR is passed an integer or integer-expression parameter, which can then be used by the machine language routine in its calculations. USR causes a jump to a subroutine whose address has been previously poked by the programmer into memory locations 1 and 2. The machine language program that runs because of the USR command may cause the value of the parameter that was passed to change. For more information about the SYS and USR commands, refer to the PET User Manual, or the PET Revealed, by Nick Hampshire.

Next issue, we will continue this series with more about machine language and assembly language programming.

# The DOS Versions

The DOS (disk operating system) is a set of programs that control all disk operations. Like BASIC these programs are built into every Commodore computer. There have been a number of different DOS versions released by Commodore. Each version is identified by a DOS number.

### DOS 1

Version 1 is an 8K DOS which functions exclusively with the 2040 dual drive unit. It supports sequential access files and block utilities which allow direct disk access. Version 1 is fitted as standard on all 2040s delivered.

### DOS 2.1

Version 2.1 is a 12K DOS which functions exclusively with the 4040 dual disk drive. The recording format has been improved to increase the reliability of disk operations on tracks 18 to 24. This has resulted in removing one sector from each of these tracks. The directory will hold 144 file entries, 8 fewer than DOS 1. There are 664 user data blocks (164.7 Kbytes of user space), 6 fewer than DOS 1.

2.1 also includes corrections of known bugs from DOS 1. These improvements increase the reliability of the built-in file management system. However "b-r" and "b-w" are not supported by this version. Utility commands "u1" and "u2" should be used instead.

The relative record file structure has been included to provide random access within a file. Any application software using the block utilities can be upgraded to work with relative records. This will guarantee upward compatibility with all Commodore disk products.

Version 2.1 is standard on 4040 drive units, available as a retro fit kit for 2040 drives.

### DOS 2.5

Version 2.5 is a 16K DOS which is fitted as standard on all 8050 drive units. The features of DOS 2.1 are all present in 2.5, adapted for additional capacity. DOS 2.5 also includes additional enhancements such as disk insertion detection for autoinitialization, expanded error recovery techniques, a utility loader for self-testing, diagnostics, and extended utility functions. This version will only fit and operate the 8050 disk drive.

### BASIC

In general, software which does not depend upon physical device attributes should be upward compatible. A BASIC 4.0 program will run on DOS 1 provided it does not use the extended features for disk access. The use of the Block Utilities is very susceptible to DOS changes.

## CONVERTING YOUR DISKETTE
*by Rick Lamb*

There have been a number of questions regarding the proper procedures for upgrading DOS 1.0 diskettes for use on a DOS 2.1 disk drive. If you have a 2040 (DOS 1.0) disk system you can upgrade to DOS 2.1 (4040 equivalent) without upgrading to BASIC 4.0. However, for correct system operation when you upgrade to BASIC 4.0 you must also upgrade to DOS 2.1 for proper system operation. A few simple code lines will convert your DOS 1.0 diskette for operation on DOS 2.1 systems:

### BASIC 2.0

```
"new dr: fn, xx"
C: D1 = D0
```

where dr = drive number
xx = unique identifier
fn = file name

### BASIC 4.0

```
header "fn", Ddr, Ixx
COPY D0 to D1
```

where fn = file name
xx = unique identifier
Ddr = drive number

Please note that once any disk has been formatted by DOS 1.0 it cannot be duplicated, verified or written to once the DOS 2.1 upgrade kit has been installed. Therefore the conversion to DOS 2.1 must be accomplished before the upgrade kit is installed. The DOS 1.0 diskette may be used for archival purposes.

# GAMES & RECREATION
# Galaxy One

*by Robert Baker*

Commodore has assembled a collection of 24 games for the PET on a single disk called GALAXY ONE. All of the games were originally sold on cassette tapes as their Treasure Trove series. Each game will run on any 2000 series PET, except the early 4K models.

A brief manual with a short description of each game comes with the Galaxy package. For more details each game provides its own operating instructions when run. Several of the larger, more complicated games actually use a separate program to give the instructions. This program then loads and starts the actual game program from the disk. Thus, a small number of the programs cannot be run from tape in their new form.

A complete review would be rather lengthy for a program collection of this size, so here's a mini review:

The LUNAR LANDING game is one of the best versions of this popular simulation game I've seen. It was written by Jim Butterfield and uses excellent graphics and real time controls.

The JUMBO JET LANDER has good graphics but is not quite as challenging. Instead of real time control, you specify thrust and rate of descent every 10 seconds while trying to land the jet. If you crash, you can back-up 10 seconds in time and try again. An auto-pilot mode will even let you sit back and watch a perfect landing.
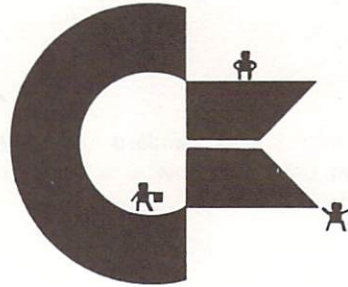
For more challenging landing simulations you can try the CONCORD LANDER or GLIDER programs. Both were written by a real pilot and provide extensive controls with limited graphics. The controls take a little while to master.

SPACE TREK is a very good Star Trek game with excellent, animated graphics. The only thing I found missing was the ability to shoot stars as found in some versions. With this version you have to move around the stars to get at the Klingons or move to another quadrant.

FORMULA 1 is the only truly multi-player game where 1 to 4 players race against each other. The cars race on any one of 4 courses for a predetermined number of laps. The game instructions are not very explicit and it can take a little while to figure out how the controls work. The graphics are very good but you can cheat when playing the game. There isn't any check that you actually circle the track, just that you cross the finish line. If you turn around and cross the line in the wrong direction you still win!

WRAP TRAP is a very good and extremely simple game. You control a moving wall that leaves a trail behind while the PET does the same. You each try to avoid your own trail as well as you opponents'. The first to run into either wall loses. This turns out to be a very challenging and addictive game.

For "thinking" type solitaire games with good graphics, there's REVERSE, where you try to order a string of numbers by reversing the order of various pieces of the string. In ROTATE you try to order a group of letters by rotating groups of four at a time. CRYPTO is a good "mastermind" game with four skill levels. Each of these is interesting and provides an endless challenge.

The PET's moves are rather slow in OTHELLO and 3D TIC TAC TOE but the graphics are pretty good. Also, the game strategies are not exceptional in either program, making them somewhat easy to beat. In SUPER 9 x 9, however, the game strategy is much better and moves very fast with machine language routines. In this game you have to get 5 symbols in a row in a 9-by-9 grid while putting up with the PET's "humorous" rating system. This game is very challenging and changes its skill level after each game to continue the challenge at your level.

SPACEFIGHT is a good two player "dog fight" type game. Each player controls his ship from the keyboard and tries to shoot his opponent but the missiles have limited range. Each shot that misses stays in space, so you have to be careful not to run into them. Unfortunately you cannot play against the PET, you really need another player.
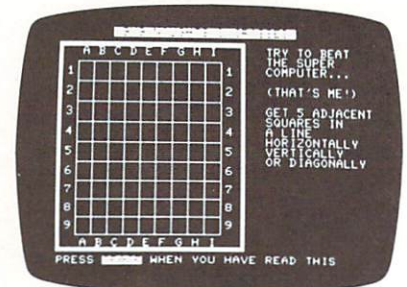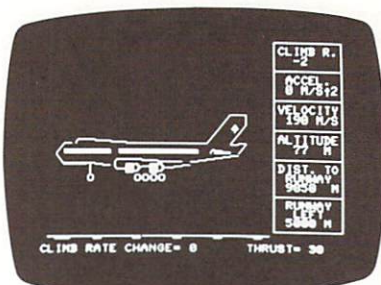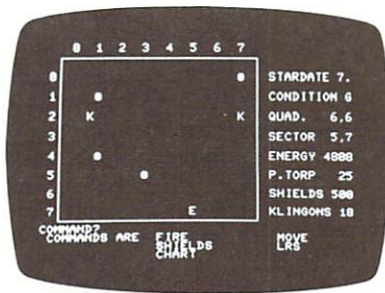
GALAXY GAMES is actually several games in one. In each you try to shoot a target while avoiding the stars. You can select the type of motion control (directional or rotational), whether the targets are stationary or moving, and how many stars are in your way (the skill level). This is supposed to be a multi-player game but actually just provides scoring for each player while only one really plays at a time. The games are good but require you to re-answer all the questions to select the game, skill, motion control, etc. everytime it's your turn to play.

Two other target type games that are somewhat similar are TARGET PONG and OFF THE WALL. In TARGET PONG you try to deflect a bouncing ball to hit a target by inserting paddles in front of the ball. Each one inserted remains in place making play more and more difficult as you progress. This is similar to a game published by CURSOR, but their version had multiple stationary targets instead of a single moving target. OFF THE WALL is slightly different. The object is to try to hit as may paddles as possible without hitting the walls (which reset your score) or the "cactus" (that clears the screen and you start over). Both of these games are fun and quite easy to play.
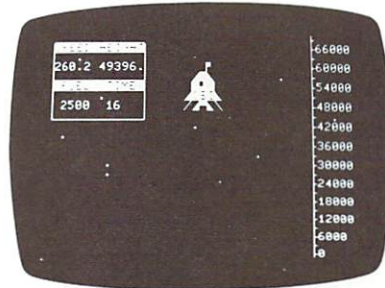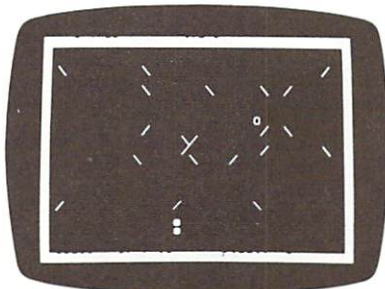
For more down to earth games, there's POLARIS where you command a submarine and try to sink the enemy fleet. This is a really good game with excellent graphics. However, the display does get destroyed occasionally by lines causing the screen to scroll. A "RESET" command was thoughtfully included to provide an easy way of getting a new display when needed.
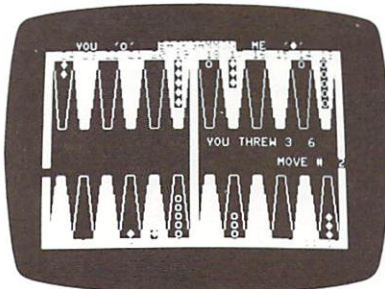
Robert Baker is a contributing editor for *Compute* and writes the PET-pouri column for *Kilobaud Microcomputing.*
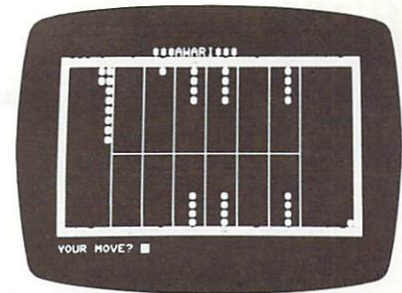
Other familiar games included in the package are BACKGAMMON, DRAW POKER, BLACKJACK, AWARI, and WUMPUS. Each game uses good to excellent graphics (except WUMPUS) and all play very well. I should point out that the DRAW POKER game is actually a betting game where you are paid various odds depending on your final hand. You don't get to play against another hand! A version of Conway's famous game of LIFE is also included to show off the advantages of machine code programming versus BASIC. Each generation is displayed in less than a second!

In review, the package contains a good mixture of interesting games at a reasonable price. Most of the games play very well and provide different levels of skill to match your experience. Also, with the instructions provided within each game you don't have to worry about losing your only copy of a complicated printed instruction manual. Altogether, a very nice piece of work.

The game package retails for $49.95.
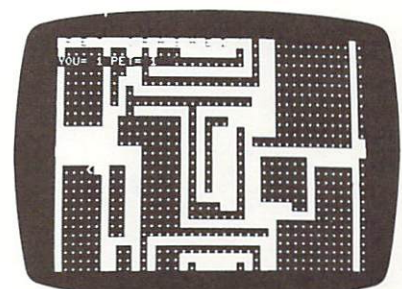
## BASICALLY FOR BEGINNERS
# A Flight Of Fancy

(a simple graphics animation)   *by Duane Later*

One of the best way to learn programming is to immediately begin programming by learning new intructions as you need them. The simple graphics program that follows can act as a good learning tool for the beginning graphics programmer. Type in the program as listed below and when run on your machine you will (hopefully) see a bird flying on your screen, landing on a tree, and then flying off again. The REM statements describe to the programmer what each BASIC code line is doing. You can then experiment with changing the lines and adding new lines. Have fun.

```
0 REM SIMPLE GRAPHICS ANIMATION
1 REM "◻" IS CLR,"⬛" IS HOME,"▮▮" IS CRSR LEFT,"◻" IS CRSR UP,"◼" IS CRSR DOWN
2 PRINT"◻◖◖◖◖◖◖◖◖◖◖◖◖◖◖";
3 PRINT"
4 PRINT"               OOOO
5 PRINT"              OOOOOO":REM THIS
6 PRINT"             OO\O|OO":REM IS
7 PRINT"             OO /OO":REM THE
8 PRINT"             OO▮O ":REM TREE
9 PRINT"                 ▮
10 PRINT"                 ▮
11 PRINT"                 ▮
12 PRINT"⬛"; :REM UPPER LEFT CORNER
15 FOR B= 1 TO 15
16 REM LINE 20-DRAW BIRD WITH WINGS UP
17 REM LINE 30-DRAW BIRD WITH WINGS DWN
18 REM LINE 40 ERASE BIRD THEN SET
19 REM UP FOR 1 UNIT DOWN,1 UNIT OVER
20 PRINT" ⬥✓▮▮▮▮";:FORA=1TO100:NEXT
30 PRINT" ⬥▮▮▮▮";:FORA=1TO100:NEXT
40 PRINT"   ▮▮◻";
50 NEXT :REM "FOR A=1TO100:NEXT" ARE SIMPLY TIME DELAYS TO SLOW BIRD DOWN.
65 FOR B= 1 TO 15
66 REM LINES 70-80 SAME AS LINES 20-30
67 REM LINE 90 SET UP FOR 1 UNIT UP AND 1 UNIT OVER.
70 PRINT" ⬥✓▮▮▮▮";:FORA=1TO100:NEXT
80 PRINT" ⬥▮▮▮▮";:FORA=1TO100:NEXT
90 PRINT"   ▮▮◻";
100 NEXT:GOTO 12:REM "GOTO 12" MAKES IT REPEAT !!!
```

# Chute

( a simple game)   *by Duane Later*

Following is the listing of a simple game program written for the 4000 series CBM computer. We call it Chute. The program can be entered and run as listed on your 4000 series computer. Minor changes are needed to run on a 2000 series computer. At the start of the game you will be falling from the upper left corner of your screen. Pressing the letter "P" on the keyboard will deploy the parachute and keep you from plummeting down to your destruction. Once it is open you will begin to fall at a safe rate. Points are scored by landing on the targets marked with XXXXs. Winds blow from the right of the screen, blowing you to the left. You can speed up or retard this drift by manipulating the control lines with the bracket keys "⟨⟩". The object is rack up the highest score possible. Good luck!

As listed, the program will run on any CBM 4000 machine. In order to run on a 2000 series PET exchange "166" with "547" on lines 21 and 22. The last number on these lines control the sensitivity of the control lines. The pull of gravity is controlled by line number 10.

```
0 GOSUB500
1 PRINT"◖▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒";
2 K=32807:B=0:C=0:D=0:R=0:A=0
3 PRINT"▤     ▪▪ ✕✕✕   ▪▪   ▪▪▪✕✕✕ ▪▪▪        ▪ ✕ "
4 PRINT"▧PROFIT "SC,"WIND IS ";
5 WI=INT(RND(1)*1000)/100:PRINTWI
6 FOROO=1TO300:NEXT
10 A=A+16.1
15 GETT$:IFT$="P"THENB=1:C=1
16 IFB=1THENA=A-.45*A
17 IFC=1THENR=R+(6*WI):GOTO20
18 R=R+(6*WI)
20 D=D+(A-8.05)/2
21 IFPEEK(166)=5 THENR=R+10
22 IFPEEK(166)=12THENR=R-10
30 H=INT(D/80):M=INT(R/80)
31 POKEK,32:K=32807+(H*40)-M:POKEK,91
35 IFD<1700THEN10
40 IFA>20THEN101
41 SC=SC-100
42 IFPEEK(K+40)=254THENPRINT"▒▒▒▒▒▒▒▒▒BUSTED LEG $300":SC=SC-300:GOTO200
50 IFPEEK(K+40)<>160ANDPEEK(K+40)<>32THEN100
60 GOTO1
100 IFA<20THEN PRINT"▒▒▒▒▒▒▒▒▒PERFECT LANDING! $500 PRIZE":SC=SC+500:GOTO200
101 PRINT"▒▒▒▒▒▒▒▒▒MULTIPLE BONE FRACTURES $1000":SC=SC-1000:GOTO200
200 PRINT"COST OF JUMP $100"
201 FORRR=1TO2000:NEXT
202 GOTO1
500 PRINT"▨◖PARACHUTE JUMP !!!":PRINT:PRINT"BY DUANE LATER"
505 PRINT"▒▒▒▒▒▒▒LAND ON ▨✕▪ TO WIN PRIZES !"
510 PRINT:PRINT"HIT P TO PULL RIPCORD !"
520 PRINT:PRINT"USE > TO DRIFT RIGHT."
530 PRINT:PRINT"USE < TO DRIFT LEFT."
540 PRINT:PRINT"WATCH OUT FOR ▨▪▪▪ !"
590 PRINT:PRINT"     ◣HIT ANY KEY◤"
591 GETA$:IFA$=""THEN591
600 RETURN
```

# BOOK NOOK

*by Joseph Devlin*

## LIBRARY OF PET SUBROUTINES

Author: Nick Hampshire
Publisher: Computabits Ltd.
Price: $19.95

## LIBRARY OF PET™ SUBROUTINES

A NICK HAMPSHIRE PUBLICATION
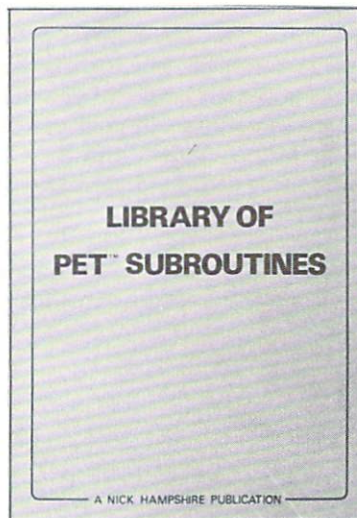
Anyone who designs his own applications software will find that *The Library of PET Subroutines* is helpful and informative and will save him an awful lot of time. The book contains 55 subroutines, each one written to perform some specific function, thus saving the programmer the trouble. All he has to do is to enter the routine and insert it into his program.

Hampshire begins with a brief introduction that describes how to go about using the subroutines that follow, integrate them into the calling program, and then how to debug them. The remainder of the book is devoted to the subroutines. These routines perform a wide range of tasks from addressing and binary search, to disk utility, plotting, and menu screen formatting. Each subroutine is clearly listed and, with a few exceptions, is reprinted directly from computer printout. A page or so of descriptive material accompanies each routine stating its purpose, the algorithm it utilizes, characteristics of the program, how to go about implementing it, and possible problems that might be encountered. In those cases where there are a variety of possible methods for achieving similar results, Hampshire tries to list a routine for each method, explaining the advantages and disadvantages of each. For instance, three array sorts are listed and described; the bubblesort, shellmetznersort, and replacesort.

These are not long programs, the longest is several pages in length, the shortest just a few lines long. Some of the subroutines are written in BASIC, some in machine language, others are a combination of both. Remark statements are included within each program listing, clearly explaining what the program is doing at any particular moment. Since this book assumes some prior programming experience it is probably best thought of as a tool rather than as a teaching aid. *The Library of PET Subroutines* can be purchased through your local Commodore dealer.

## PET/CBM PERSONAL COMPUTER GUIDE

PET/CBM Personal Computer Guide, 2nd revised edition
Author: Adam Osborne
Carroll S. Donahue
Publisher:
Osborne/McGraw Hill
Price: $ 15.00

### PET/CBM PERSONAL COMPUTER GUIDE
SECOND EDITION

Adam Osborne · Carroll S. Donahue
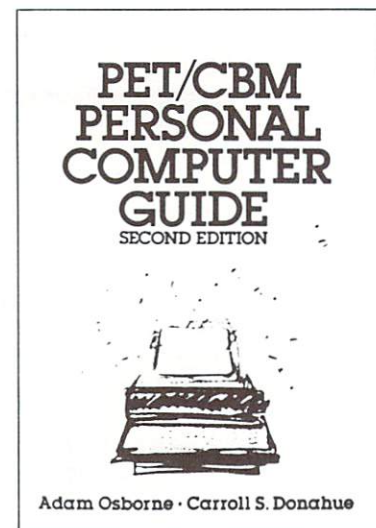
This edition of the *PET/CBM Computer Guide* is a major revision of the old "red book" of the same name. It is probably the best guide to CBM products on the market today. Within its new white cover are 501 pages that provide you with a step-by-step guide to the use of all the Commodore computers, from the original PET 2001 through to the CBM 8000 series as well as Commodore's cassette drive, two floppy disk units (model 2040 and the model 8050) and two printers (model 2022 and model 2023).

The first 4 chapters are written with the beginning computerist in mind. This section makes good use of illustrations and pictures, assumes no prior knowledge of computers, and will guide the beginner as he gets to know his machine. Chapter 1 includes a

brief survey of all the CBM computers, describing each machine and detailing its features. The next two chapters cover rudimentary information that the beginner needs to operate his computing system: how to operate your printer, load programs, edit text and the like. Chapter 4, "Programming the Computer" is a 50 page elementary BASIC tutorial.

The rest of the book will be of interest to the more experienced computerist. These later sections of the book delve into some of the intricacies and quirks of the machines and deep mysteries of programming them that might be difficult to find elsewhere. Chapter 5 "Making the Most of CBM features" covers such topics as: the keyboard buffer, string concatenation, input, output and mathematical programming, graphics, and random numbers. The chapter that follows focuses in on peripheral devices, taking time to more fully describe their use and to give some explanation of how they operate. Chapter 7 gives information about the system itself covering such topics as: BASIC statement storage, initialization, data formats, the memory map, and assembly language. The last chapter looks at Commodore BASIC in detail, examining each command individually. The book is capped off with a comprehensive series of appendices that list error messages, and character codes, and provide memory maps, conversion tables and a bibliography.

This is a book that will guide the beginner, help the intermediate, and support the experienced programmer. *The PET/CBM Personal Computer Guide* may be purchased directly from Osborne/McGraw Hill.

Osborne/McGraw Hill
630 Bancroft Way
Berkeley, California 94710



THE PET REVEALED

— A NICK HAMPSHIRE PUBLICATION
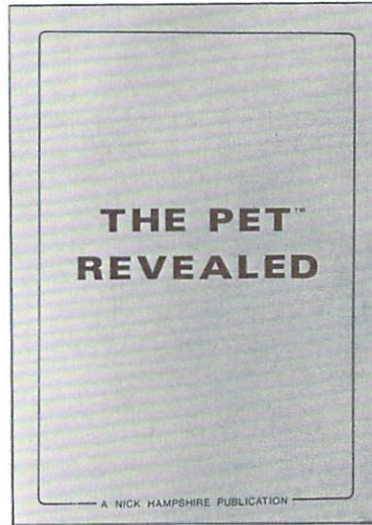
As its title implies, *The PET Revealed* is a reference volume. It provides a concise and accurate summary of everything you are likely to wish to know about the way a PET works. The book contains a great deal of useful technical information not normally found under one cover.

In its introduction the book is described as "a collection of discoveries about the PET, how and why it works, how to use these facts to write better programs and perform more interesting functions." The description is a good one. Hampshire concentrates on the PET itself, not on programs to be run on the PET. The focus is upon the PET, not the CBM or VIC computers, though much of the material covered also applies to these machines. This is not a "How to use your PET manual." Although a number of useful subroutines (including machine code TRACE and DOUBLE DENSITY PLOT) are listed, material of a tutorial nature is sparse.

The book begins with a good explanation of the PET's internal system hardware design. The chapter covering the workings of the 6502 microprocessor provides an excellent technical description and summary of the microprocessor. A description of the operating system comes next. Full listings are given for page zero usage, subroutines comprising the Basic interpreter, and tokens/character codes, followed by details on program and variable formats in memory.

The remainder of the book is devoted to input/output and interfacing. The user port is dealt with alongside the 6522 specifications, and the mysteries of the IEEE bus explained with reference to PET's two 6502s.

For the home-electronics types there are circuits for monitor drivers, joysticks, and even an IEEE/RS232 converter, construction of which looks suprisingly simple. On the subject of interfacing, Hampshire is clearly in his element. This book will be best appreciated by the intermediate or experienced computerist. It will be useful to anyone who wishes to gain a clear understanding of the internal workings of the PET. It is also for PET programmers attempting something difficult. Originally published in England, the book is now available through your local Commodore dealer.

# COMPUTERS, PERIPHERALS AND CABLES

## Computers

| | | |
|---|---|---|
| **VIC 20** | First full-featured, expandable color computer system. Full PET keystroke graphics with 5k RAM, expandable externally to 32k RAM. | |
| **PET 4001**<br>**PROFESSIONAL COMPUTER**<br>    4016<br>    4032 | PET with large terminal styled keyboard with separate numeric pad and graphic keys and a 40 column by 25 line display (BASIC 4.0 OS). | 16N<br>32N |
| **CBM 8000**<br>**BUSINESS COMPUTER** | Features a typewriter styled keyboard with separate numeric pad, and 80 column by 25 line display and new screen editor functions, and BASIC 4.0 Operating System. | 8032 |

## Peripherals

| | |
|---|---|
| **CBM 4040**<br>**DUAL DRIVE**<br>**FLOPPY DISK** | Dual drive intelligent 5¼" mini-floppy disk system with 343K byte net user storage capacity (DOS 2.1) |
| **CBM 8050**<br>**DUAL DRIVE**<br>**FLOPPY DISK** | Dual drive intelligent 5¼" mini-floppy disk system with over 950K byte net user storage capacity (DOS 2.1) |
| **CBM 4022 DOT MATRIX**<br>**TRACTOR PRINTER** | 80 column dot matrix printer with forms handling tractor feed. Has full PET graphics, variable line spacing, programmable character and character enhancement. |
| **CBM**<br>**MODEM** | High performance 300 BAUD IEEE interfaced modem features accurate teleprocessing communication for your CBM system. |
| **CBM**<br>**VOICE SYNTHESIZER** | Features phoneme systhesis for vocabulary construction (rather than memory limited digital techniques). User port interface permits easy installation to any CBM/PET system. |
| **CBM C2N CASSETTE DRIVE** | Cassette input/output unit to use with PET/CBM computers. |

## Cables

| | |
|---|---|
| **IEEE to IEEE CABLE** | Use this cable when connecting more than one peripheral (Floppy and Printer) to any PET/CBM Computer (P/N 905080). |
| **PET to IEEE CABLE** | Use this cable to connect your Floppy or Printer to any PET/CBM Computer (P/N 320101). |

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*address correction requested*